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Audrey and Woody Watson
Owners
Gulf Coast Plumbing of Belle Chasse, La., LLC

Seeking Higher Ground

Friendships with customers drive business for Gulf Coast Plumbing

Page 10

contents

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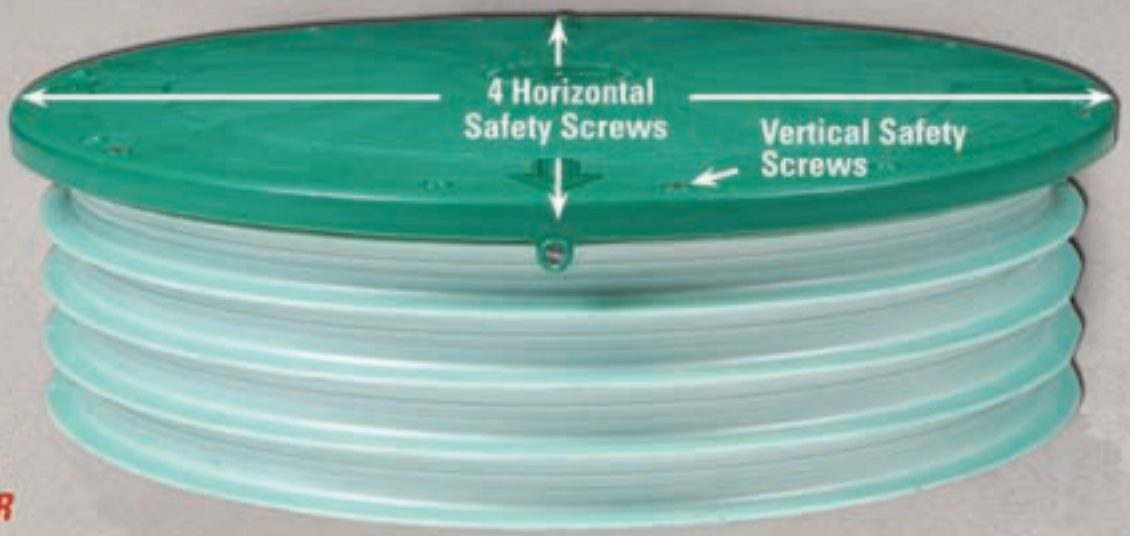

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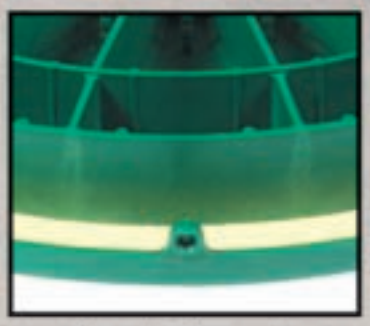

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Looking Beyond Housing?

People still aren't building new homes at anything like the normal pace. How can onsite installation contractors adapt and thrive in this economy?

By Ted J. Rulseh, Editor

The slump in the housing market began about three years ago, and its effects have been widespread. Onsite installers and designers have been hit hard, right along with the homebuilders, plumbers, masons, carpenters, and appliance, furniture and fixture makers.

Heads of onsite industry associations have reported that installation businesses have been hurting, many cutting back, some going under, some diversifying, a goodly number struggling to maintain their association memberships, and so associations have had a tough time, as well.

The housing market has rebounded more slowly than expected. A 6- or 12-month slowdown is challenging enough to get through. Three years is much worse, especially when it's still hard to see the upturn at the far end.

So, what are onsite professionals — designers, installers, consultants — doing to take up the slack? We'd like to explore this question in a future issue.

Staying upbeat

In talking to professionals around the industry, I don't see many signs of doom and gloom. During the Pumper & Cleaner Expo last March, I saw good representation from the designer/installer community. These were people persevering, still investing in new knowledge, making adjustments in their businesses, and looking to emerge stronger when things do improve.

But from a practical standpoint, what has it been like? What are your secrets for getting through? There seem to be a variety of approaches. Dan Ragan of Ragan Grading & Septic Tanks in LaGrange, Ga., a 30-year professional, was remarkably optimistic. He retains three employees, each with him about eight years.

The business is fairly diverse, with a wide range of general backhoe, dozer and front-end-loader work in addition to the onsite business. Of course, some of that is housing-related, as well. Ragan, a Georgia Onsite Wastewater Association member, has kept going in part by getting more involved in system repairs, many of which actually involve complete drainfield replacements.

So while his new-system business has gone down, he has been able to backfill some of it with substantial repair projects.

Looking to O&M

Some other installers I've spoken to are looking to what's already in the ground as new income sources. A few reported purchasing vacuum trucks for the first time and getting into the pumping business. Others have expanded into operation and maintenance of advanced systems, which in some states require maintenance contracts.

In the past most installers seemed to prefer simply to install, leaving the maintenance to others. But now more seem willing to adapt to the different business model that O&M requires and dedicate themselves to it, instead of just letting all that work go to someone else.

Of course, some professionals look at their machinery and everything that it can do besides excavate for onsite systems. So now they're more deeply into moving earth for any purpose that suits a customer.

We'd like to hear your story. If your business has been slower during the recession, how have you coped? What has the experience taught you? What will be different for you when the better times come again, as they must?

Send me a note with your comments to editor@onsiteinstaller.com. I promise to respond, and we'll report on your stories in a future issue. ■

During the Pumper & Cleaner Expo last March, I saw good representation from the designer/installer community. These were people persevering, still investing in new knowledge, making adjustments in their businesses, and looking to emerge stronger when things do improve.

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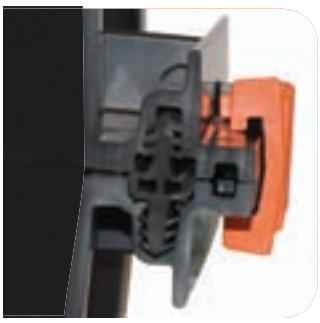

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CORRECTION

Risers and lids shown and described in the July 2011 System Profile in this magazine were supplied by **Tuf-Tite, Inc.** of Lake Zurich, Ill. (800-382-7009, www.tuf-tite.com). Because of incorrect information supplied to *Onsite Installer,* a different manufacturer was listed in the story. We apologize for this error.

LETTERS TO THE editor

Concrete Septic Tanks Are Watertight

The article, "Finishing Touches," in the June *Onsite Installer* included information about backfilling tanks and watertightness and stated "Tanks with mid-wall seams have a high probability of not being watertight."

We would like to address this statement by clarifying a few things. Watertightness of an underground tank depends on the answers to three fundamental questions:

- Is it strong enough to withstand all the anticipated earth loading and hydrostatic pressures, whether it is empty or full? If not, it will begin to fail and collapse, and watertightness becomes the least of our problems.
- Is the material itself able to stop fluids from entering and exiting the tank?
- Are the joints and connections configured and sealed so as to prevent the ingress or egress of fluids?

Precast concrete septic tanks should be designed and built according to ASTM C1227–Standard Specification for Precast Concrete Septic Tanks. That standard refers to 25 other ASTM, ACI and ANSI standards and contains requirements for material quality control, manufacturing, sealants and connectors, structural and physical design, and performance test methods, including vacuum testing.

ASTM C1227 does not contain any reference to the location of the joint. Why? Because a mid-seam joint or a top-seam joint will be equally effective in keeping the tank structurally sound and watertight. Mid-seam joints are configured in an interlocking configuration, such as a tongue-in-groove or lap joint, that will prevent lateral movement and maintain structural strength. The joints must fit tightly — within 3/8 inch. When a high-quality joint sealant is applied properly to the joints, the result is a watertight seal.

Regardless of the seam's location, precast concrete septic tanks must be manufactured with high-quality raw materials in a controlled environment with an emphasis on quality control. Pre-pour inspections ensure that reinforcement is properly sized and placed. Post-pour inspections ensure that there are no cracks, voids or any other defects that may diminish the structural capacity of the tank.

Proof testing will simulate field conditions. ASTM C1227 stipulates two methods of verifying that the tank is watertight and strong enough to counter anticipated forces: hydrostatic testing and vacuum testing. They are performed according to detailed requirements so that they simulate actual anticipated loads.

Many NPCA members manufacture mid-seam septic tanks, and specifiers and homeowners know these tanks are reliable and strong enough to endure exposure to varying loads and conditions. That is why they are still widely specified and used today across the country. For more information on the manufacturing, quality control and installation of precast concrete septic tanks, please refer to our *Onsite Wastewater Tanks Best Practices Manual* at www.precast.org/onsite_bpm.

For further questions, please visit NPCA's website at www.precast.org, or contact our technical department at 800/366-7731 or technical@precast.org.

Claude Goguen, P.E., LEED AP
Director of Technical Services
National Precast Concrete Association

Owner Woody Watson, left, and technician Phillip Butler inspect the placement of an aerobic treatment unit from Delta Environmental. Gulf Coast Plumbing has provided reliable service for 26 years around Belle Chasse, La. (Photography by Sean Gardner)

Seeking Higher Ground

Gulf Coast Plumbing deals effectively with challenging soils while building a business based on friendships with customers

By Gil Longwell

Gulf Coast Plumbing of Belle Chasse, La., LLC

OWNERS: Woody and Audrey Watson

YEARS IN BUSINESS: 26

MARKET AREA: 100-mile radius

BUSINESS MIX: 50 percent new installations as complete repairs, 25 percent new installations for new construction, 25 percent repairs

SPECIALTY: Solutions for challenging sites and failing systems

EMPLOYEES: 3

There isn't much high ground south of New Orleans. Contour lines on topographic maps are far apart, and the water table is always close to the surface.

In an area where 15 to 20 percent of newly installed onsite systems fail due to high-water issues, Woody Watson has been successfully installing for 26 years. His company, Gulf Coast Plumbing of Belle Chasse, La., serves customers in five parishes (counties) in a 100-mile radius. Regardless of the terrain, he has positioned his business on higher ground.

That means working hard to solve challenging site problems for new installations and replacements. It means getting the job done completely, through full site restoration, for a fair price. And it means working with people so that they become not just customers but friends.

TLC yields success

The first few minutes of a telephone conversation with Watson seldom address the person's reason for calling. Watson or his wife and partner Audrey answer the business line, and they always begin with a "How you doin'?" or a similar opened-ended greeting that sets the tone for a call with a friend.

"People want a relationship, not just a system," Watson believes. "People want to talk about their situation. They want to talk about more than just business."

They also serve as educators. "Homeowners don't read the do's and don'ts booklet," says Watson. "It seems like they do all the wrong things — they just don't seem to care!" He attributes some of that to experience, where they could flush more or less anything without concern because they were served by municipal sewers. There is frustration in his voice.

> **"Homeowners don't read the do's and don'ts booklet. It seems like they do all the wrong things — they just don't seem to care!"**
> Woody Watson

Being a resource for customers and friends, Audrey finds her expe-

(continued)

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On June 18, our trading name of Bord na Móna Environmental Products U.S. changed to Anua.

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Helper Joe Bobb, left, and technician Phillip Butler check the components on the ATU after installation.

rience enables her to answer most questions. "She is good with people," says Woody. Occasionally, when they get a question and can't answer, they tell the caller they don't know. "Then we get the answer and call back," says Audrey. "People want TLC, and we give it to them."

First a plumber

Starting out in the plumbing business, Watson, a master plumber in Louisiana and Texas, learned aerobic treatment systems first from the plumbing installer's perspective. In the early days, when contracted to install an ATU system, he hired an excavator to prepare the site and install the absorption area while he focused on the plumbing and wiring.

"I saw how much of the job I was giving away and decided I was missing an opportunity," he says. After qualifying for the appropriate installer's license, Watson refocused on installation work.

When he didn't get the support he expected from the local aerobic treatment unit dealer, he contacted the manufacturer. After meeting with top management at the plant, he was offered the local distributorship. "It was hard to qualify," he says. "To be a distributor, we must stock a sufficient number and variety of parts, be available to our customers to help solve installation issues, troubleshoot problems, and provide training."

Until about two years ago, he was installing about four treatment units per week. Now, it's about one a week. He attributes this to the decline in the new housing market: The focus these days is on less-than-whole-system repair work.

Before selecting Delta Environmental as his preferred ATU manufacturer, Watson did a lot of homework on the treatment process and the components. "Our soils are so fluid that they exert significantly more compressive force on tanks than you see in drier environments," he says. "Delta's cylindrical tank delivers far greater crush resistance than a square tank.

In addition, the effluent quality from the units helps Watson offer viable solutions for sites with shallow water tables where septic tank effluent simply cannot be discharged, and where direct discharge to surface waters may be the only alternative.

"Aerobic units require ongoing maintenance, and the state makes sure that every system with an ATU is covered by a contract," says Audrey. Gulf Coast Plumbing has about 150 systems under contract.

What Goes Around …

Many years ago, a devastating cold snap and hard freeze damaged countless homes' water systems in the New Orleans area. Woody and Audrey Watson spent days helping people get their plumbing systems back on line. "This was a time before lots of installation work when Woody was focused on plumbing," explains Audrey.

The Watsons were first called to help a friend with his freeze-damaged pipes. Then the friend's neighbor needed help. "We stayed on the job, in the crawl space under the house, fixing broken pipes until the job was done," says Woody. "Then we moved to the next job." They did it with no fanfare — just working to help people get their lives back on track.

The Watsons remember how some plumbers were charging unfairly, doubling or tripling their rates just because they could. It didn't take long for those they helped to see how differently the Watsons approached their situation. Later, when they or their friends needed onsite system installation or repair work, they remembered and called their friends, Woody and Audrey.

"At a time when we could have charged almost anything because we had a skill people desperately needed, we made a decision to treat folks like we would want to be treated," Audrey says. No doubt they left money on the table, but that could be seen as an investment. The Watsons say they have been blessed with a tenfold return.

"Aerobic units require ongoing maintenance, and the state makes sure that every system with an ATU is covered by a contract."
Woody Watson

Rather than go into the pumping business, they rely on a network of pumpers across the service area.

Water and soil

High groundwater is a persistent issue. "You can't put water into saturated soil and expect treatment," says Watson. "I've been digging long enough to know how different soils will perform as soon as I see them."

In Louisiana, each county health department sets the parameters for system design to match site conditions. Site testing includes soil evaluation to identify water table elevation, along with perc testing. Together, the results determine the treatment technology and absorption area (filter bed) selection and sizing. Using these parameters, the installer designs the system and prepares a permit application appropriate to the site conditions.

Technician Phillip Butler (right) and helper Joe Bobb work on an ATU installation. Gulf Coast Plumbing is a distributor for Delta Environmental treatment systems.

In the early 1990s, the law was changed to require any failed system to be replaced with an aerobic treatment unit and appropriate dispersal system. In addition, the use

(continued)

"We charge a fair price for what we do. We do not gouge. We stay on a site until the job is done, and we never, never leave before there is complete site restoration. People see this and tell their friends."
Woody Watson

of tar-coated metal treatment tanks was stopped. "I've seen a lot of those tanks where the baffles rotted off and the absorption areas were plugged tight with solids," says Watson. "It is not enough to teach homeowners what not to flush. They must also be taught how to maintain their system."

A tracked mini-excavator comes in handy as Phillip Butler, left, and Woody Watson place an ATU.

The list of approved treatment and absorption area technologies is not long. Aerobic treatment units are the norm. Gravelless chambers are a common absorption area technology where water tables are not too close to the surface. When the water table is high, the treated effluent is chlorinated before discharge to the chambers.

Based on years of observation, Watson believes he has identified a correlation between septic tank effluent and very slowly permeable soils. He believes these two conditions promote the accumulation of sludge in the chambers' void space as that microenvironment becomes anaerobic. He supports aerated treatment and effluent disinfection before discharge to chambers.

Spray irrigation is another option for final effluent management, but it, too, has drawbacks. "I have encountered many spray heads that were clogged," Watson says. "The clogging results from fine particles that escape the treatment tank and become lodged in the tiny hole in the nozzle." There is also the "ick factor" when the lady of the house understands exactly what the spray heads will discharge in her backyard.

At some sites, the only alternative is to discharge ATU-treated and disinfected effluent to a road ditch or a natural waterway.

Wild wildlife

While ill-informed homeowners create challenges, nature itself creates others. "Just keeping the grass cut around control panels, compressors and pump housings is far more critical in this environment than elsewhere," Watson says. "Homeowners seem to forget this."

Heat and the moisture associated with tall grass create an attractive habitat for red ants, which invade control panels and any enclosed place they can get to where heat builds up. Their presence alone can ruin equipment by preventing heat from dissipating. "Aside from the nuisance of killing them and removing their dead bodies, when they are alive, they can deliver a nasty bite, and it seems you never get bitten just once," Watson says.

Four-inch-diameter air vents in pump enclosures must be equipped with a vented cap — which allows ants to enter but defeats the inquisitive and problematic armadillo. These animals try to enter the dark, warm, enclosed space, where they may roll into a ball and get stuck in the unprotected vent pipe. Armadillos have also been found in effluent discharge lines, creating such a tight seal that the entire system backs up.

Working within the business environment also means getting along with all the parish sanitarians who oversee their work. Watson's role as a Delta Environmental distributor assures that he cooperates with other installers, who may be both customer and competitor.

"Periodically, I put on a training session for entry-level sanitarians from the parishes in which we work," he says. "Anybody is welcome — new sanitarians, experienced sanitarians, and my Delta customers, too."

The Gulf Coast Plumbing team includes, from left, technician Phillip Butler, helper Joe Bobb, and owners Audrey and Woody Watson.

Plenty of work

With Audrey (vice president) managing the office and handling the daily phone traffic, Woody is in the field as crew leader and equipment operator. Joining him in the field are technician Phillip Butler, replacing the late loyal employee Tommy Bailey, and helper Joe Bobb. They're supported by a pair of Kubota trackhoes, a 1989 KX91 and a 2004 KX41. A 2005 Kubota 3240 tracked front-end loader is equipped with a box blade.

"We charge a fair price for what we do," says Watson. "We do not gouge. We stay on a site until the job is done, and we never, never leave before there is complete site restoration. People see this and tell their friends.

"We are busy — even in this economy, we are busy. Our relationships with customers result in very positive word-of-mouth advertising, and because of what is said about us, we have more work than we can handle."

The Watsons have seen installation customers naturally evolve into friends and, in many cases, system management customers. It's a natural progression built upon that first greeting: "How you doin'?" ■

MORE INFO:

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

What is a Hydraulic Load Test?

Questions surround this method of testing a system during a point-of-sale inspection. Here is how to do it correctly.

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

This month we take a detour from our journey through onsite wastewater treatment systems to address a topic that has been raised in letters to the editor and in online chat rooms: What is a hydraulic load test for time-of-sale system inspections?

There are two major reasons to conduct a hydraulic load test as a part of a point-of-sale real estate inspection. First is to determine whether the sewage effluent moves through the system as designed. Second is to determine if the final soil dispersal area will accept the effluent delivered to the area.

While experts largely recognize that some type of hydraulic test is necessary to document that a system is operating properly, there has been wide disagreement of how to conduct the test and how to interpret the information.

This test should not be confused with hydraulic tests or soil evaluations associated with determining the design soil-loading rate. Such tests are used with the estimated average daily sewage flow rate to determine the size of the soil treatment area. Here, the purpose is to inspect an existing system to determine whether all necessary components are present and are operating the way they should.

Some confusion

While experts largely recognize that some type of hydraulic test is necessary to document that a system is operating properly, there has been wide disagreement of how to conduct the test and how to interpret the information.

To a certain extent this confusion results from lack of agreement nationally about how effluent can be distributed to a series of gravity-fed treatment trenches. As anyone knows who has attended our educational seminars, we are strong proponents of sequential distribution using drop boxes versus distribution boxes.

Inspection ports at the ends of the trenches, whether using distribution boxes or drop boxes, allow easier and more accurate evaluation of how much of the system is being utilized under existing flow rates. That in turn makes it easier for the inspector to answer whether the water is moving in the system the way it should, and whether the soil is accepting the effluent.

There have been some efforts to provide a standardized hydraulic load test for point-of-sale inspections. Probably the most notable is a protocol provided by the National Sanitation Foundation (NSF). In addition, some states, such as Pennsylvania and Alaska, have established protocols to make this determination. Other states have chosen to not provide guidance other than to say the system needs to be evaluated.

A truck carries equipment needed for a septic system inspection and operation test.

Just add water?

The test itself involves introducing a specified volume of water downstream from the septic tank to the soil treatment unit. The evaluation includes observing whether water:

- Flows back into the tank
- Surfaces in the yard
- Is accepted by the soil

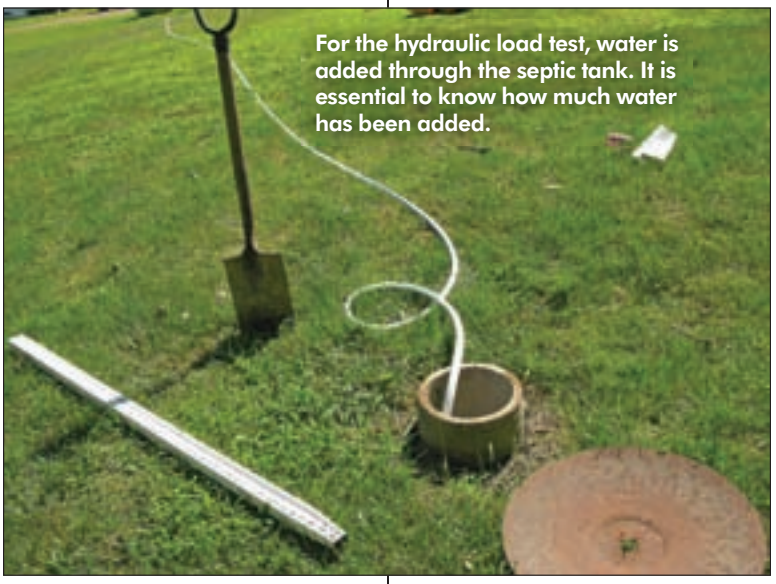
The first two findings clearly indicate problems with the system. The water is usually introduced using a hose from an outside sillcock connected to a water meter to determine the amount of water delivered at the outlet of the septic tank.

One major area of discussion and disagreement about the test is what volume of water should be added. As we travel around the country conducting inspection workshops, we hear a variety of opinions on this issue. Some suggest using the average daily flow. Others say to open up all the faucets in the house and let them run for an hour. Our all-time favorite is from Malibu, Calif.: "Use 2,000 gallons because when we party, we party in a big way!"

Basic steps

Leaving that issue aside for the moment, here are the general procedures to follow when conducting

The inspection pipe in the soil treatment area allows the observer to measure the change in depth after the water is added to the system.



For the hydraulic load test, water is added through the septic tank. It is essential to know how much water has been added.

a hydraulic load test:

- Record any inspection port liquid levels, if any, in reference to the as-built drawings or site plan.
- Using a dedicated hose with backflow prevention, begin introducing water at the specified point downstream from the septic tank.
- Record the test start time.
- Monitor and record the liquid levels in the inspection ports every 30 minutes for two hours. If the liquid rises to the critical level (top of the media in all laterals or the bed) before the end of the two hours, stop adding water and return the following day.
- Assuming the liquid level did not rise above the critical level, turn off the water after the desired volume is delivered.
- If the system has a gravity soil treatment area, wait 30 minutes for stabilization. Then record and document the liquid levels in all inspection ports.
- Return in 24 hours and repeat the test, first recording the liquid levels in the inspection ports.
- Walk the entire soil treatment area and surrounding areas to verify that no adverse conditions have resulted from the test (such as surfacing effluent, saturated soils, or downslope breakouts).
- Clean and sanitize all test equipment before returning it to your service vehicle.
- Secure all inspection port covers, cleanout caps, and any other system access points that were opened for the test.
- Clean any residuals that might contaminate the surrounding area of the system site.
- Document all findings and test results into a formal report for filing with the appropriate permitting authority.

What about volume?

In inspection workshops we have conducted for the National Association of Wastewater Transporters we have suggested introducing 100 gallons of water, or the equivalent of about two consecutive loads of laundry. Our reason is that 100 gallons should be adequate to determine whether the system will back up into the septic tank, and a system should be expected to accept the equivalent of the water from two loads of laundry to be considered operating properly.

However, some states have different requirements, and some recommend the use of the NSF standard: introducing the estimated average daily sewage flow. So we have consistently heard that there is a need for a more standardized approach.

There are also some interpretation issues with the level of effluent ponded in trenches during system operation. If sequential distribution is used, it is not uncommon to have effluent ponded to the tops of the trenches in parts of the system. Some jurisdictions view any level of ponding as indicating failure. This is not the case, but it is a required interpretation in some states and counties.

For these reasons and others, a subcommittee of the NAWT education committee has been drafting a standard operating procedure to be used with the NAWT inspection education program. The procedure has used the NSF standard, the Pennsylvania Septage Management Association (PSMA), and a standard from Alaska as a basis.

The intent is to publish this procedure in a variety of places and have it available on the NAWT website for review and comment. After comments are received and addressed, it will be presented as a procedure that can be adopted as a standard. We will keep you up to date with the status of this effort. ■

"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.*

Ontario Looks to New Regulatory Standards

By Scottie Dayton

Changes proposed by the Ontario Ministry of Municipal Affairs and Housing would bring onsite regulations in line with those recently established by the Bureau de Normalisation du Québec, an accredited standards development council.

The province now uses an American standard that cannot measure how onsite systems perform in Canadian climates. Under the proposals, effluent must be pumped to the drainfields. Installers must use higher-grade sand in the absorption area and wrap the distribution laterals in copper wire for locating without excavation. The proposals, which could take effect by 2012, would affect new homes and remodeling projects.

New York

If proposed Westchester County onsite regulations are approved, the Maintenance of Separate Sewage Disposal Systems/Onsite Wastewater Systems ordinance would be added to town codes.

It would implement the state Department of Environmental Conservation (DEC) municipal separate storm sewer systems permit for towns in the Croton watershed, and would require septic tanks to be pumped and inspected every five years. The DEC permit, effective May 1, was mandated by the state as part of a federal stormwater initiative. It requires towns to have an ongoing program in place to inspect, maintain, and repair onsite systems. Towns will use pumpout records collected by the county to enforce the law.

Oregon

The Department of Environmental Quality instructed an advisory committee to establish proposed rules allowing citizens to use graywater outside their homes. A permit would allow do-it-yourself installation of systems of commercial graywater systems. The department estimates that 10 percent of new homes could be built with these systems. The state Environmental Quality Commission could institute the rule in August.

New Hampshire

The Great Bay Community Protection Act would require the U.S. EPA to conduct a peer-reviewed study of the impact of nitrogen released into the Great Bay Estuary. It also would ban the agency from requiring nitrogen removal or taking further action for five years. The legislation was introduced after the EPA mandated that treatment plants in the Great Bay Estuary limit effluent nitrogen volume to 3 mg/l. Some officials anticipate similar requirements on onsite systems.

Connecticut

A bill proposing time-of-sale onsite inspections for onsite systems died in committee. The proposal did not state who would perform the inspections, what level of proficiency inspectors would need, or provide a protocol for the inspection process.

Delaware

The Department of Natural Resources and Environmental Control entered its third year of rewriting onsite regulations. Some rule changes include accepting Wisconsin at-grade mounds as standard systems, requiring concrete septic tanks to meet OWPA/NPCA standards for structural integrity and water tightness, requiring effluent filters to be cleaned every six months, and regulating the size of tire chip aggregate.

The proposal creates a Class I construction inspector to inspect new gravity systems as well as replacements and repairs. It also would establish a tiered approach to licensing soil scientists and system contractors.

Washington

Public comment brought revisions to the Ephrata sewer ordinance requiring homeowners with a sewer within 200 feet of the property line to connect to it. Proposed changes would move the requirement to 200 feet from the residence, and would allow existing onsite systems to remain until they fail, the inspection is not reported, or the property is sold. Systems outside the 200-foot distance could be replaced or rehabilitated.

The proposal also would require the pumping and inspection of high-use and residential septic tanks every five years, and commercial and low-use tanks every 10 years. Upon sale of the property, new owners would have 60 days to tie to the sewer. ■

Large-Scale and Commercial Onsite Treatment Systems

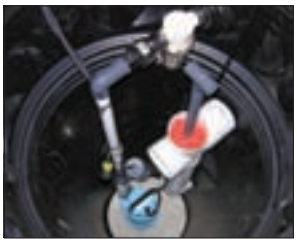
By Pete Litterski

Lightweight pumps

The cast-iron **CPEH5** pump from **Champion Pump** is designed for applications where effluent must be pumped through a long run of pipe or high static heads. The cast-iron 3/4-inch solids handling pump has a 65-foot shutoff head. The pump will pump effluent through the equivalent of 5,200 feet of 2-inch pipe (based on 5-foot static head).

At 35 pounds, the pump is almost half the weight of other cast-iron pumps of similar capability. The pumps are provided with an internal seal and secondary V-cup exclusion seal. The rotating components of the seal are in the motor housing, lubricated by the dielectric motor oil. A high-efficiency 115-volt (or optional 230-volt) PSC motor with upper and lower ball bearings is protected by a thermal overload switch. **800/659-4491; www.championpump.com.**

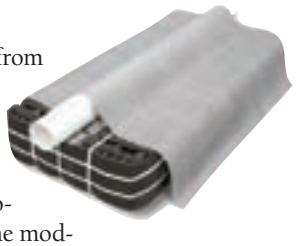
Hanging pump vault septic tanks



With working capacities from 900 to 1,500 gallons, **ST-HPV** septic tanks with internal hanging pump vaults from **Waterloo Biofilter Systems** allow users to demand-dose advanced treatment units or leachfields directly from the septic tank. The systems come fully preplumbed and assembled inside Roth MultiTanks.

Units include risers, inlet plumbing, effluent filter, effluent pump, float controls, quick-disconnect dosing line, and optional inline strainer. By eliminating a separate pump chamber, the units reduce the system footprint, reduce installation time and complexity, reduce the number of risers, and reduce the number of inspection points during routine maintenance. **866/366-4329; www.waterloo-biofilter.com.**

Sand filter system



The **GSF** Geotextile sand filter system from **Eljen** offers a proprietary two-stage Bio-Matt process that provides treatment and disposal in the same footprint. Septic tank effluent is filtered through the fabric while the module's design provides increased surface area for biological treatment. Open-air channels within the module support aerobic bacterial growth on the module's fabric interface.

An antisiltation fabric covers the top and sides of the modules and protects them from soil intrusion while maintaining effluent storage. Effluent passes through the filter and slowly drips into a specified sand layer that surrounds the module. This results in a zone of unsaturated flow and the application of a secondary treated septic tank effluent to the native soil. Independent tests based on NSF/ANSI Standard 40 Protocol have shown that the system provides advanced treatment of septic tank effluent to better than secondary levels. **800/444-1359; www.eljen.com.**

Lift station pump

Diesel-powered **Enviro-prime** pumps from **Thompson Pump** are an alternative to backup generators for lift stations. The permanently installed standby units continue pumping despite power loss or primary pump failures. The pumps are available in sizes 3 through 18 inches and can handle flows of up to 11,000 gpm and solids up to 4.25 inches in diameter. The dry prime pump also supplements lift station pumps during routine maintenance or emergency repairs. **800/767-7310; www.thompsonpump.com.**

Venturi/compressor primed pumps

Prime Aire Plus pumps from **Gorman-Rupp** use the same venturi/compressor priming system as the company's Prime Aire line but offer increased head and flow and enhanced maintenance features. Models include up to 8-inch flanged discharge sizes and provide flows up to 4,950 gpm and heads to 475 feet. They are suitable for both clear liquids and liquids containing large solids. The pumps are available coupled to the latest EPA Tier-compliant engines or premium-efficiency electric motors. **419/755-1011; www.GRpumps.com.**

Versatile pump controls

Septronics offers **pump controls** at four heights for exterior applications. The watertight, UV-treated junction boxes fit all pedestal units whether 42, 35 or 27 inches tall and also work with low-profile fittings on the riser. For wall-mounted applications, heavy-duty brackets fit on the back of the same junction box. High-impact poly pedestals are UV-treated and suitable for commercial and residential applications. **262/567-9030; www.septronicsinc.com.**

Fat-eating tablets

Mighty Mike FOGHog tablets from **Scienco/FAST** are for use in lift stations and collection systems to remove fats, oil and grease and help increase water flow from constricted pipes. The tablets have more than 25 billion active "class 1" bacteria per gram to function in aerobic or anaerobic conditions. The live bacteria consume and break down the fats, oils and grease. A premeasured tablet placed in the wastewater stream continues to reproduce every 20 to 40 minutes until the fat is consumed. **314/645-6540; www.sciencofast.com.**

Remote control panel viewer interface

TCOM Viewer from **Orenco** is a software interface between Windows PCs and TCOM remote telemetry control panels. The interface stores configurations for multiple sites, has a simplified "double-click to select" mouse interface for menu items, and offers new screen color choices for better visibility. Sites can be sorted by factory identification number or by operator-designated panel name.

The interface also helps facility managers and operators take full advantage of TCOM's SCADA functionality, such as remote access and control plus the ability to retrieve and graph log data from monitored panels. The viewer is available to TCOM customers at no charge and works with virtually all TCOM panels, no matter when they were installed. **800/348-9843; www.orenco.com/controls.**

Advanced treatment

The Advanced Enviro-Septic system from **Presby Environmental** provides treatment and dispersal in one footprint. NSF/BNQ protocol testing shows the system removes up to 99 percent of wastewater contaminants without pumps, filters, electricity, replacement media or special maintenance. The system, for residential or commercial installations, consists of corrugated, perforated high-density plastic pipe wrapped with layers of geotextiles and a mat of randomly oriented green fibers.

Skimmers at each perforation keep suspended solids from exiting the pipe while a Bio-Accelerator and green fibers provide large surface areas where aerobic bacteria grow and treat wastewater, protecting the outer black geotextile receiving surface so that it remains permeable. Only treated wastewater is wicked into the System Sand surrounding the pipes, protecting the groundwater and native soils. Maintenance is limited to normal pumping of the septic tank. **800/473-5298; www.presbyenvironmental.com.**

Pump filter

The **No-Vault** pump filter from **SIM/TECH FILTER** protects turbine pump intake screens. Filtration is achieved through a 6-inch-diameter PVC screen with 1/16-inch perforations. The shorter model has 139 square inches of open area, while the tallest model has 325 square inches. With 35 to 80 times the open area of the intake screen, the filter reduces the frequency of screen cleaning. The interior sealing sleeve allows the filter to adjust to different pipe heights. The smallest unit handles pumps up to 25 1/2 inches tall, while the largest unit handles pumps up to 49 1/2 inches tall. **888/999-3290; www.simtechfilter.com.**

Antimicrobial disc filters

Geoshield antimicrobial solution from **Geo-Flow** is impregnated into the disc filters to prevent clogging and help filters stay clean longer. The units are designed to manage the high biological demand of wastewater without clogging. The system provides protection by inhibiting the growth of bacteria and other organisms at the source. Maintenance can be reduced and drip system life extended. Self-cleaning or manual clean filters are available in 1 1/2- and 2-inch sizes for residential, commercial, industrial and municipal projects. **800/828-3388; www.geoflow.com.**

Timed-dose controls

The **50A800** series controls from **Septic Products** deliver timed-dose applications in simplex and duplex configurations. The panels have a nonmetallic enclosure that is light but impact-resistant and UV-protected. A 360-degree red alarm light and 90 dBa rated buzzer come standard for high-water alarm notification.

The panels are UL listed to 508A and include circuit breakers, motor contactors, HOA switches, and SST lockable latches. The repeat cycle timer allows users to set on and off cycle times and can be simply adjusted to provide dosing cycles in seconds, minutes or hours. The panels are packaged with three float switches. **419/282-5933; www.septicproducts.com.**

Submersible aerator

The **MAXAIR500** aerator is a replacement unit from **Septic Services.** Submersible aerators sit down in the tank and handle extreme weather conditions. They provide a high oxygen transfer rate and use the same or less electricity. The aerator has a continuous-duty motor and stainless steel motor enclosure and legs. It is prewired with a 15-foot cord. **800/536-5564; www.maxair500.com.**

Control panels

Power Zone control panels from **CSI Controls** maximize relay life by increasing the load capacity of the relay. Each NEMA 4X control panel includes a front-mounted touchpad with exterior LED indicator lights and a digital display center for programming pump information, including elapsed time and cycle counter for each pump, high-level counter, float status indicators, low-level alarm on/off selection, lead pump selection, and adjustable level and alarm settings. The panels are available in single-phase junior, simplex and duplex models for demand-dose or timed-dose applications. They can be ordered with a pedestal with access door for easy installation. **800/363-5842; www.csicontrols.com.**

Lift station controls

The new **Flygt Station Control Panel** from **ITT** allows for operational change without rewiring. At the heart of the panel is the APP 721 all-in-one station controller. Its preconfigured wastewater transport control algorithms allow collection system optimization. When remotely accessed, the panel improves station visibility and operational efficiency. This cuts man-hours and costs while providing data to meet environmental reporting needs. The panel can be accessed through AquaView SCADA software or integrated into existing centralized software. **704/409-9700; www.flygtus.com.**

Floatless sensors

The **C-Con** converter box from **SJE-Rhombus** is designed to convert most simplex and duplex control panels to use the floatless technology of the company's C-Level sensor. The box converts the signal from the sensor to simulate float levels (up to four floats). Activation levels can be set and adjusted at the converter box by using the output dials, eliminating the need to go

into the tank to move float tether points.

The simulate button allows testing for proper wiring of outputs. The converter box includes a Type 1 enclosure for indoor use and can be mounted inside of a control panel. Connection is simple with factory-installed output and power wires. The box works well in wastewater pump tanks, confined-space applications and systems with high grease content and can be used as an alternative to mercury float switches. **888/342-5753; www.sjerhombus.com.**

Efficient pumping

The **Little Giant 6EN and 10EN** sump and effluent pumps from **Franklin Electric** use permanent split-capacitor motors, providing low-current draw, energy efficiency, and high performance. Designed for extended or continuous use, the pumps are fully submersible and are suited for dewatering and light effluent applications. **260/827-5256; www.franklin-electric.com.**

Filter/pumping packages

The combination of **Bear Onsite** multi-level effluent filters with **Quanics** STEP (Septic Tank Effluent Pumping) Systems works with wastewater applications from single-family residential to small-diameter collections systems.

The Bear Onsite case adapter makes it easy to manifold multiple filters, supporting the higher flow needs of pump systems. STEP systems are available as individual components or preassembled in packages that include the filters. Applications include drainfields, effluent sewers, sand filters, peat filters, packed bed filters, mound systems, trickling filters, aerobic units, wetlands, lagoons and effluent irrigation. **901/831-5155; www.bearonsite.com; www.quanics.net.**

Ultraviolet disinfection

The **3G** wastewater UV disinfection unit from **Salcor** offers fouling-resistant Teflon, two-year lamp life, and minimal maintenance and requires 0.72 kWh per day to operate. Manufacturers of 20 aerobic units have partnered with the company in six-month NSF tests to secure approvals in Washington and other states. The 3G unit is rated NEMA 6P and is flood-resistant. It has been UL certified for the United States and Canada. The unit is rated at 6 gpm (8,640 gpd) peak effluent flow. Series and parallel-series arrays of units are disinfecting effluent flows up to 100,000 gpd. **760/731-0745.**

Time dose control with monitoring

Smart Panels from **Alderon Industries** give you complete control and monitoring of your time dose system. Set your specific dose times to the second, view elapsed time meter(s), event counter(s), alarm cycle counter, and timer override cycle counter for simplex, duplex and triplex systems. The alarm system includes a red alarm beacon which is mounted on top of the panel and an alarm buzzer with test/silence switches to test your system. Twenty-foot float switches come with the panel as a standard feature. The UL-listed Smart Panel can also be customized for your specific application. The smart panel uses high-quality IEC motor contactors for pump control, and includes circuit breakers, HOA switches, and an O&M manual with schematics. The Smart Panel can be ordered in single phase or three phase with NEMA 4X or NEMA 1 enclosures. **218/483-3034; www.alderonind.com.** ■

CASE studies

Large-Scale and Commercial Onsite Treatment Systems

By Scottie Dayton

Residential membrane bioreactor

Problem

Alternative Wastewater Systems in Caldwell, Idaho, wanted to test the **BioBarrier membrane bioreactor from Bio-Microbics** in a residential installation. Ryan Spiers of Spiers Construction in Caldwell identified a new four-bedroom home as part of a community collection system discharging to an evaporation pond. He asked the homeowners if they would upgrade from a MicroFAST 0.5, also from Bio-Microbics, to the 500 gpd bioreactor at no cost. They agreed.

Solution

The 60-pound unit, installed in a precast septic tank, replaced an aerobic treatment unit. The bioreactor's flat sheet membranes in a double-plate configuration provides high surface treatment while acting as a physical barrier for most water pollutants. Effluent moves through the pores to the space between the films, and a pump then discharges it. The system requires no backwash. "The bioreactor sits in black water and produces permeate that looks like store-bought bottled water," says Spiers.

RESULT

The installation was the first of its kind in the state to evaluate membrane treatment for a single-family home. The NSF/ANSI STD 40/245-certified system was tested every other month. Direct discharge effluent samples averaged less than 2 mg/l BOD and TSS, less than 1 mg/l ammonia, and less than 10 *E. coli* colonies per 100 ml. The system received the 2009 Technology Award from the *Environmental Business Journal*. **800/753-3278; www.biomicrobics.com.**

Solution for rural fishing village

Problem

Failing onsite systems in the rural fishing village of Victoria, Prince Edward Island, were discharging into the harbor. Provincial regulators would not approve new development or business expansion until the village solved its sanitation problem.

Since the lots were too small for conventional systems, Kelly Galloway, P.E., from Engineering Technologies Canada in Stratford, looked for a cost-effective compact solution that would recharge the island's groundwater and accommodate hydraulic variations during the tourist season.

Solution

Galloway chose an effluent sewer and **AdvanTex AX100 treatment system from Orenco Systems** to service 57 homes and six commercial sites with effluent gravity and effluent pumping equipment. An interceptor tank at each property acts like a septic tank, only the anaerobic biological processes consume the solids. Residential tanks require pumpouts every 10 years or more, and larger tanks even less frequently.

The 10 5,000-gpd pre-engineered treatment pods have an absorbent nonwoven textile media that produces effluent clean enough for the pressure-dosed sand bed and drip irrigation fields. The sand filter works year-round and the drip system during the tourist season.

The 16- by 8- by 3.5-foot pods install and service easily, have telemetry monitoring, and draw 3 kWh per 1,000 gallons. In summer, the system uses all 10 units to treat 25,000 to more than 50,000 gpd. In winter, it uses three pods and two pumps, conserving energy and extending equipment life. The site has room for five more pods.

RESULT

Effluent averages less than 6 mg/l BOD5 and TSS. A part-time operator monitors the system remotely. Galloway won the 2009 Engineers PEI Award for Engineering Achievement, and Victoria earned the 2010 Municipal Achievement Award from the Federation of PEI Municipalities and the 2011 Sustainable Community Award from the Confederation of Canadian Municipalities. **800/348-9843; www.orenco.com/systems.**

Attached growth anaerobic and aerobic treatment

Problem

Sewage from failed onsite systems in a 1970s subdivision in central Kentucky backed into homes or surfaced in yards. Small lot sizes and shallow clayey soils, high water tables, and rock depths made replacing the systems difficult, as did landscaping, pools, and outbuildings. The health inspector and installing contractor decided advanced treatment systems with drip irrigation would provide the best long-term solution.

Solution

They chose the **Fusion ZF-450 treatment system from Clarus Environmental.** The pre-engineered, fully assembled unit has four chambers. In the first, microorganisms on a fixed spherical-skeleton type filter create a high-performance septic tank.

Anaerobic treatment occurs at the same time suspended solids are captured. The floating and circulating chamber has an upper aeration section and a lower suspended media section. The compartment is filled with hollow cylindrical media on which bacterial colonies grow. Biological aeration treatment is continuous, while the filter captures residual suspended solids.

Because sludges develop rapidly in the third chamber, the filter is backwashed for five or 10 minutes twice daily. Air vigorously stirs the media to break up accumulated materials. An airlift pump transfers wastes back to the first chamber for further digestion and to aid in nitrification. The fourth chamber temporarily stores treated water leaving the floating and circulating chamber before discharging to a dose tank for dispersal.

RESULT

Effluent averages 9 mg/l CBOD5 and TSS. Since the system was installed, no surfacing sewage has been observed. Property disturbance was minimal due to the compact treatment units and installation of the drip tubing with a vibratory plow. Energy cost is about $4 per month with the programmable linear air diaphragm blower. **877/244-9340, www.clarusenvironmental.com.**

Clogging problem eliminated

Problem

The wastewater treatment plant at the Oak Hill Estates mobile home court in Holly, Mich., transfers sewage from an equalization tank to a batch reactor. The pump was consistently clogging and the motor overheated and failed twice. There was potential for the tank to overflow. Highland Treatment, the court's contractor, performed extensive maintenance to keep the pump running. They contacted a Crane Pumps & Systems distributor, Jett Pump & Valve, to provide a rental while the pump was being repaired.

Solution

Jett Pump & Valve recommended replacing the pump with a **Barnes SH pump** based on its success in a lift station in a nearby community. A 4SHV nonclog 7.5 hp pump with vortex impeller was installed. The slotted discharge flange allowed the pump to be installed to the existing discharge piping with no modifications. The pump allows 3-inch solids handling capability and handles stringy solids at low flows. The volute allows the impeller to form a vortex that passes 98 percent of the solids without directly contacting the impeller. The impeller resists clogging from stringy and other difficult solids.

RESULT

The pump has not clogged since installation. Elimination of service calls and maintenance during inclement weather has meant significant cost savings and a safer work environment. Operations supervisor Mark Dowson calls it "maintenance free." **937/778-8947; www.cranepumps.com.**

Solution for 27-acre campground

Problem

The Department of Environment told the owner of Crystal Beach Campground on Prince Edward Island to replace his lagoon system in one month. The campground, on Malpeque Bay and next to a protected wetland, has 250 campsites, cottages, a swimming pool, recreation center and laundry.

The owner worked with Ken Reardon, director of business development for Atlantic Purification Systems Ltd. (APS), a distributor of wastewater products in Dartmouth, Nova Scotia. The governing jurisdiction allowed a tank-to-drainfield design, but Reardon was concerned about the structural integrity of the shimmed or multiseamed tanks available in Atlantic Canada.

Solution

The pair chose **ZCL Composites, a Canadian manufacturer and parent to Xerxes Corp.,** to supply a 20,000-gallon fiberglass tank. The owner believed the excavation for and pouring of a cast-in-place tank would be too disruptive to campers.

APS manufactured the tank to order and delivered it quickly. The lightweight tank was easy to ship and install. Because of the high water table and buoyancy factor, workers secured it to concrete deadmen with straps and turnbuckles.

RESULT

The septic tank is protecting the sensitive waters and the campers' health. **800/661-8265; www.zcl.com or www.xerxes.com.**

(continued)

CASE studies

Large-Scale and Commercial Onsite Treatment Systems

By Scottie Dayton

Recirculation biotower

Problem

Auberge du Portage, a seasonal inn and health spa in Notre-Dame-du-Portage, Québec, has 46 rooms, a 120-seat restaurant, 15 massage suites, six showers, and a laundry with three washing machines. Effluent from the overloaded drainfield polluted the St. Lawrence River. Replacement technology had to fit in a limited space, treat high-strength wastewater, adjust to hydraulic variations, and work in difficult soils with shallow depth to bedrock.

Solution

Engineers selected the **Segflo recirculation biotower and Ecoflex polishing process from Premier Tech Aqua.** The treatment train included a grease trap, septic tank, dose tank, biotower, nitrogen removal, UV disinfection, and discharge to the river. The restaurant generated 4,400 gpd and the inn 10,100 gpd.

The biotower has snowflake-shaped PVC media to provide a large surface area for bacteria. Passive and natural oxygenation occur through water trickling from the top of the tower to the bottom, then pumped back up to the top. Recirculation also eliminates odors. Sloughed off excess biomass accumulating at the base of the tower is pumped periodically to the septic tank. The modular Ecoflex system removes nitrogen, adapts to seasonal use, and is easy to operate and maintain.

RESULT

Effluent samples have less than 10 mg/l CBOD5 and TSS with less than 10 E. coli colonies per 100 ml, better than the wastewater discharge limits to the St. Lawrence River of 30 mg/l CBOD5 and TSS. **418/867-8883; www.premiertechaqua.com.** ■

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Don't (Always) Blame the Installer

Odor problems in facilities with onsite treatment systems often can be traced to issues outside the installer's responsibility

By Russ Lanoie

When there's a sewage odor at a home or other building with a septic system, the tendency is to blame the onsite installer first.

But odors can have causes well outside the installer's control. So when an odor problem arises and you are called to investigate, be prepared to do a little detective work. It could help save your reputation and help the owner find the real source of the trouble.

Persistent smell

Just a few years ago our community of Mount Washington Valley, N.H., built a beautiful new nature learning center — a stunning structure that produces its own power, heats itself mainly by the sun, has its own septic system. As a regular volunteer at the center, I heard the staff complain about a persistent foul odor in the building, thought to be coming from the septic system.

It's not a new Pope, but assurance that the roof vent for the plumbing was clear.

As luck would have it, one day when I happened to be at the center, the plumbing backed up into the building. Acting quickly because there were several school kids in programs at the building, I located and uncovered the septic tank and found a 90-degree elbow installed at the inlet pipe, sending septage down below the level of the water in the tank. I removed the elbow, and the pipe cleared itself.

I was told that the original site contractor had installed this elbow after hearing about the odor problem, in an effort to stop sewer gas from backing up into the building. This did not solve the problem, and it created another one.

I had seen many 50- to 75-year-old systems installed with an elbow at this location instead of the tee that we use as an inlet baffle to allow sewer gases to vent through the plumbing to the building's "stink pipe" and out through the roof. It's possible that this down-facing elbow was originally intended not to serve as an inlet baffle but to block odor for older plumbing that often was not vented as well as modern plumbing.

Simple smoke test

Thinking the problem might be odor from the roof vent finding its way back down and in through open windows, I supplied a charcoal filter for the vent pipe. This provided little relief, so I suggested that a plumber check all the toilet seals to be sure they were secure – a leaky toilet seal can easily let odor into a building without leaking any water.

The test equipment: a handheld leaf blower connected to the inlet pipe of the septic tank, a rock to help deflect wind to help the smoke get into the blower, and a 30-second smoke bomb. (Photos courtesy of Russ Lanoie)

Almost immediately we could tell that the house vent was clear because the charcoal filter spewed white smoke as if we had just elected a new Pope. We also got a lot of smoke in the men's room — enough to set off the fire alarm system that is directly connected to the local fire department.

Just after an experienced plumber reset each of the toilets, the center had a well-attended activity accompanied by a lot of bathroom use. I was told the next day that the smell was "enough to gag a maggot." So I set out to determine just where the odor might be coming from by doing a crude but effective smoke test.

This technique involves the use of a few pipe fittings, a leaf blower, and a smoke bomb from a plumbing supply store — the same type of smoke bomb that heating system installers use to test the integrity of their hot-air distribution systems.

ABOVE: The smoking gun: Smoke from behind a urinal is proof positive that the leak was the plumber's fault and not the septic system installer's. LEFT: The back of the removed urinal shows where the seal slipped down during installation, keeping water from leaking out the bottom but letting sewer gases out the top.

In this case, I used a 90-degree elbow attached to the inlet pipe, pointed up and out of the tank, connected to another 90-degree elbow and reduced by a rubber connector to the discharge of the leaf blower. By setting the smoke bomb next to the air intake of the running blower, I was able to pressurize the plumbing system with smoke, in hopes of seeing just where odor might be getting into the building.

The real culprit

Almost immediately we could tell that the house vent was clear because the charcoal filter spewed white smoke as if we had just elected a new Pope. We also got a lot of smoke in the men's room — enough to set off the fire alarm system that is directly connected to the local fire department, whose representatives soon arrived.

When I showed the photo of the smoke billowing out from behind the urinal to the firemen, they were as astonished as we were. The problem stemmed from the seal between the urinal and the wall flange — it had slipped out of position as the urinal was installed. It never allowed any water to leak, but the odor took its toll on the staff for four years before we diagnosed the problem.

I was confident from the start that the septic system could not be the problem, but it took the smoke test to prove it. And aside from the cost of running the fire truck up to the center, the whole test cost only a few bucks.

How you can do it

Here are a couple of things to consider if you do this sort of smoke test to prove that a smell is not your septic system's fault. I used a 30-second smoke bomb that sells for about $6. Start with at least a couple so that you can learn by trial and error.

Since I already had the leaf blower, I saved the cost of a professional smoke test unit that sells for well over $1,000. A shop vacuum discharge hose probably would have worked just as well. I simply aimed the smoke bomb discharge (out the side of the device) toward the blower.

But be forewarned: Start the blower and warm it up before hooking it up to the sewer pipe connections. If you start the blower cold when it is already hooked up, the high idle of the cold engine will be enough to blow the water out of some of the plumbing traps. While it's easy to refill the traps, it takes a little mopping to clean up the water from the floor and walls.

If possible, disarm the fire alarm system in case your test is as successful as ours was — unless you have a good working relationship with your local folks in red trucks.

About the author

Russ Lanoie is a 40-year veteran septic system installer and former designer who specializes in locating, troubleshooting and repairing systems in New Hampshire's White Mountains. He is a past member of the Granite State Designers and Installers and maintains a troubleshooting website at www.RuralHomeTech.com. ■

Keeping It Shallow

A STEP system provides a sound treatment solution for a campus and community with high limestone bedrock

By Scottie Dayton

The multipurpose Englishton Park (Ind.) campus had closed because of a failed sand filter. One mile away, most septic tanks in the Scott County Town of Lexington drained into road ditches.

The park owners hired Kevin Chaffee, P.E., chief engineer of HydroLogex in Batesville, Ind., to design an onsite system for Englishton Park that could be expanded to serve the town. Chaffee and the owners worked with the Scott County Sewer District's engineer, Bill Saegesser, P.E., of Saegesser Engineering in Scottsburg, to design the treatment facility.

"The site is in the 100-year floodplain of Town Creek," says Chaffee. "A major concern was meeting the stringent NPDES discharge permit limits because the creek has no water to dilute the treated effluent during the dry season."

Saegesser chose an effluent sewer for the town because limestone is shallow and prevalent, making the cost of conventional gravity sewers prohibitive. The septic tank effluent pumping (STEP) system eliminated blasting through the stone to lay the pipes. The campus system has operated since November 2005 without permit violations. The Lexington system went into service in summer 2011.

Site conditions

Soils are clayey loam with slate and limestone below. The high seasonal water table is three to four feet below grade.

System Profile

Location:	Lexington, Ind.
Facility served:	Campus and town
System designers:	Kevin Chaffee, P.E., HydroLogex LLC, Batesville, Ind.; Bill Saegesser, P.E., Saegesser Engineering, Scottsburg, Ind.
Installers:	Richard Vuckson, R. L. Vuckson Excavating, Scottsburg; Chris Jackson, Dan Cristiani Excavating Co., Clarksville, Ind.
Site conditions:	Clayey loam with slate and limestone below; high seasonal water table three to four feet below grade
Type of system:	Recirculating media biofilters with STEP system
Hydraulic capacity:	50,000 gpd

Workers from Dan Cristiani Excavating set the second 10,000-gallon EnviroFilter biofilter from HydroLogex. (Photos courtesy of Saegesser Engineering)

System components

The system is designed to handle 50,000 gpd. The major components are:

- Two 10,000-gallon dual-compartment fiberglass septic tanks in series with a Polylok PL-525 effluent filter in the second tank. Tanks made by Containment Solutions.
- 108 1,000-gallon single-compartment concrete septic tanks with ProSTEP high-head pump package from Orenco Systems. Tanks made by S&M Precast, Henryville, Ind.
- Five 10,000 gpd EnviroFilter package recirculating media biofilters with simple duplex pump control panels supplied by HydroLogex, Franklin, Tenn.
- Nitrification aeration unit from Siemens.
- Lift station with alternating 150 gpm, 2 hp Myers pumps on guide rails.
- LBX pressure-rated UV disinfection system from ITT Water & Wastewater – WEDECO.

System operation

Wastewater from multiple buildings at Englishton Park flows through 6-inch PVC gravity sewers to the septic tanks. Effluent flows to a distribution box that directs it to the first biofilter.

Wastewater from the STEP collection system is pumped through 1.25-inch PVC laterals to 3-inch force mains. Each connection has a backflow preventer in a service valve. Every time the pump vaults run, they push effluent to the distribution box for dispersal to the remaining four biofilters.

Septic effluent, entering the bottom of the units, is stored in a

recirculation basin below the filter bed. The 2 hp duplex Myers effluent pumps charge five spray nozzles that evenly distribute effluent over a 24-inch-deep bed of polyester textile chips for the attached growth process. The liquid trickles through the media, falls through a porous underdrain, and mixes with the incoming effluent in the recirculation basin.

A programmable logic controller doses the media 72 times per day with a 4:1 recirculation ratio. During recirculation, 20 percent of the treated effluent enters the integral dosing basin with aeration system that raises the dissolved oxygen level above 6 mg/l to meet discharge limits. The system includes a HydroLogex control panel, a HiBlow GP40 air pump, and Stamford Scientific fine-bubble diffusers.

Two 0.5 hp duplex STA-RITE (Pentair) pumps in the dosing basin send the water on demand to the nitrification aeration polishing reactor in a 10-foot-diameter, 10-foot-deep concrete pit. The reactor has a

"We played it by ear every day. In some areas, we needed hoe rams and excavators to hammer out limestone to set the tanks deep enough."
Chris Jackson

4:1 recirculation option, allowing the operator to return liquid to the distribution box if the inflow is low. At this point, it has less than 5 mg/l TSS and BOD, less than 1 mg/l ammonia, less than 20 mg/l total nitrogen, and less than 2 mg/l phosphorous with 99.4 percent reduction of total coliform.

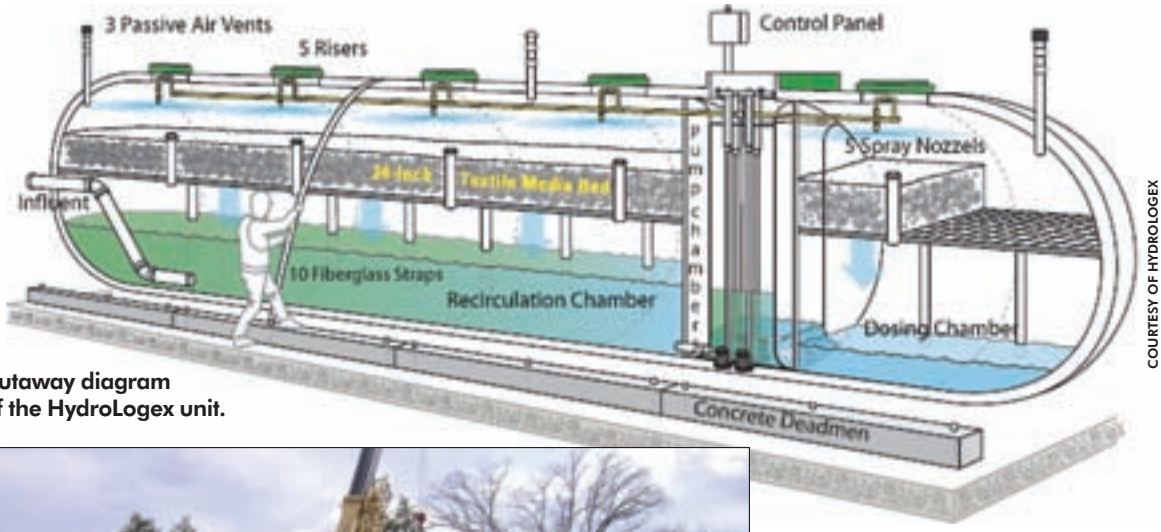
Water then flows by gravity to the lift station, and 300-gallon doses are then pumped on demand to the disinfection chamber in the control building, also housing sampling ports and a flowmeter. Tightly positioned lamps in the chamber disinfect the water with low UV transmittance. The water then gravity flows to the creek.

Installation

Richard Vuckson of R. L. Vuckson Excavating in Scottsburg, Ind., installed the Englishton Park system. Chris Jackson of Dan Cristiani Excavating Co. in Clarksville, Ind., installed the Lexington system over nine months.

Jackson held meetings and went door to door preparing homeowners for the construction. Following easements wherever possible, his crews used rock trenchers and mini-excavators to install the force mains and laterals. Once inside yards, they worked wherever there were no utilities or old systems, which had to remain in use until the treatment plant was installed.

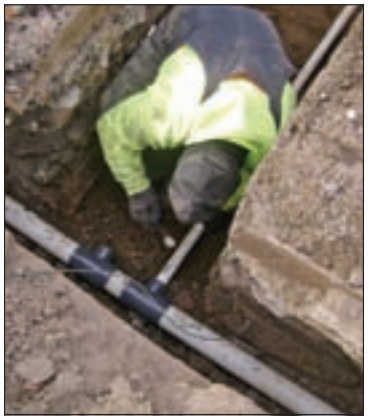
Setting the septic tanks with three feet of cover was equally challenging. Many lots were small and workers often found something in the way as they began to dig. "We played it by ear every day," says Jackson. "In some areas, we needed hoe rams and excavators to hammer out limestone to set the tanks deep enough."



COURTESY OF HYDROLOGEX

Cutaway diagram of the HydroLogex unit.

Outriggers support a 200-ton crane as it lifts a 15,000-pound EnviroFilter biofilter tank and prepares to set it 90 feet away on a gravel bed.



A worker from Dan Cristiani Excavating connects a service lateral to the force main.

A hoe ram breaks up two feet of limestone before laying a 12-inch gravel base for the last four biofilters.

Preparing the site for the 72-foot-long biofilters took two hoe rams and an excavator to remove two feet of limestone in preparation for the 12-inch gravel base. "We crushed that limestone and used it to bed the 200-ton crane," says Jackson.

Delivering the 15,000-pound units required drivers to back their tractor trailers around a 90-degree bend in a narrow country road, then between a stone wall on one side and trees on the other. Jackson brought in a shorter tractor to make the turn, then stationed three men on either side of the trailer as the driver kept reversing, pulling ahead, and straightening out until the trailer was in position.

The crane, supported by outriggers, then lifted and set the tanks 90 feet away between pairs of concrete deadmen. Workers secured each of them to deadmen with 10 straps and turnbuckles.

"Normally, we bury the tanks two to three feet below grade," says Jackson. "Because the risers had to be above the maximum flood height, we backfilled and covered the tanks with soil for support and insulation." With the treatment system in place, workers connected the homes and decommissioned existing septic tanks.

Maintenance

Jason Combs, a licensed wastewater operator from the Scott County Regional Sewer District, operates and maintains the plant and STEP system. Twice a year, he cleans the filters on the recirculation pumps, cleans the spray nozzles, and checks the pumps and controls. The septic tanks are pumped every two years. The textile chips self-clean and should require no maintenance. ■

MORE INFO:

Containment Solutions, Inc.
877/274-8265
www.containmentsolutions.com

HydroLogex, LLC
615/975-4773
www.hydrologex.com

ITT Water & Wastewater – WEDECO Products
704/409-9700
www.ittwww.com

Myers
419/289-1144
www.femyers.com

Orenco Systems, Inc.
800/348-9843
www.orenco.com
(See ad page 3)

Pentair Water
888/987-8677
www.pentairwater.com

Polylok, Inc.
877/765-9565
www.polylok.com
(See ad page 40)

Siemens Water Technologies Corp.
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SJE-Rhombus Expands Floatless Technology Option

C-Level floatless technology from SJE-Rhombus has been expanded to include Installer Friendly Series Three Phase Demand/TD and Capacitor Start/Run models. The sensor converts water pressure in a tank into a low-voltage electrical signal and sends it to the IFS panel, displaying it in inches or centimeters. Pump activation and alarm levels can be adjusted using the panel touchpad. **888/342-5753; www.sjerhombus.com.**

Best Controls Introduces Phase Conversion Line

Phase conversion panels from Best Controls Co. convert single-phase (230-volt) input power to three-phase (230-volt) output to operate 2 to 10 hp three-phase pumps. Each panel has an inner door design, flashing alarm light and audible alarm with alarm silence PB, pump and control circuit breakers, motor starters with adjustable overloads, automatic pump alternation, pump-run lights, HOA switches, pump seal fail indicator and elapsed time meters with NEMA 4X fiberglass enclosure and three-point latch. Options include generator receptacle with transfer switch, stainless steel enclosure, battery backup, alarm dialers and more. Panels can be customized for triplex and quadruplex pump applications, ranging from 7.5 to 75 hp. **800/349-1905; www.bestcontrolscompany.com.**

Liberty Introduces Sump Pump Duplex Control

The 5050 Series duplex sump pump control from Liberty Pumps provides alternating operation of two 120-volt pumps. In the event of a pump failure, power is switched to the other pump and the built-in alarm is activated. The control is NEMA 1 rated for indoor mounting and is available with vertical or wide-angle floats. Plug-in-ready wiring offers easy installation. **800/543-2550; www.libertypumps.com.**

Greenovative Introduces EcoHancer Septic Treatment

EcoHancer septic treatment from Greenovative Technologies is designed to stimulate existing microbial populations, accelerating growth and activity within the system. Made from naturally occurring peat, the nontoxic treatment works to improve septic tank settling, reduce sludge buildup and maximize drain performance while reducing suspended solids in effluent. **856/234-4540; www.jshinternational.net.**

Clarus Offers Turbine STEP System

The Turbine STEP septic tank effluent pump system from Clarus Environmental is designed for simplex or duplex applications in a single polyethylene pump vault. The large, unobstructed area for float placement reduces the risk of hang-ups. Made to fit any 19-inch septic tank opening, pumps are available in 11, 19, 27, 35, 55 and 85 gpm models. Standard height is 56 inches. Custom heights range from 51 to 96 inches. The deep-pleated filter provides 924 linear feet of 1/16-inch filtration and is easily removed for cleaning. The system's flat-bottom design is made for freestanding applications. Pipe supports are available for suspended applications. The inlet is predrilled at the factory or can be blank for field customization. **877/244-9340; www.clarusenvironmental.com.** ■

Are You A Winner?

Membership in a state and national onsite association is a solid investment in yourself, your company and your industry

By Eric Casey

You're a busy person. Often it seems there isn't enough time in the day. Money is tight, and with the economy only recovering slowly, your business may not be where you would like it to be. So why spend money to join an industry association? Here are a few reasons to consider:

Association members are winners. A study by the William E. Smith Institute for Association

Research found that people who belong to associations are more successful than those who do not. And — take notice — they earn on average some $10,000 per year more, even with the same education and job type. Members are also 19 percent more likely to say they're very satisfied with their jobs.

Does this mean joining an onsite organization will automatically make you wealthier and happier? No, but as the old adage goes: "Success breeds success." With whom would you rather surround yourself — those successfully building their businesses? Or those complaining about how lousy business is and how hard life is?

Membership helps you find business opportunities. Whether through conferences, newsletters, or a network of peers, associations help you grow your business. Members are usually first to learn of new technologies that help them deploy onsite systems where solutions weren't available before. They are first to learn about new regulations and what they mean for their businesses. By being connected to others "in the know," they can get a jump on competitors when a new housing development is approved, or on where to find the best O&M opportunities.

With whom would you rather surround yourself — those successfully building their businesses? Or those complaining about how lousy business is and how hard life is?

Membership helps you improve your skills and credentials. Most states have some type of credentials or licenses, and most state associations are prime sources for the training you need to earn them. Association members usually get discounts on training — often greater than the dues they pay.

Associations help you chart the future of your industry. When new state or national rules are proposed, associations are almost always consulted. And the feedback associations provide to regulators is based on what they hear from you and other members. They serve as the voice of the profession and give you a chance to be heard.

Association membership is not an expense. When you consider the benefits — networking with other successful people, finding new business, increasing your expertise, giving yourself a voice in the regulatory process — your dues are really an investment in yourself, your company and your profession. Find out more about membership in NOWRA and one of its state affiliate associations at www.nowra.org.

Eric Casey is executive director of the National Onsite Wastewater Recycling Association. He can be reached at 800/966-2942 or wecasey@nowra.org. ■

It's Not Either/Or

By Jennifer Cisneros

Okay, maybe you get why you should join your state association, but why do you need to belong to NOWRA, also? The value of "and" versus "or" should not have to apply here.

Your state association provides valuable information that pertains to your area, but how can you be competitive when you get the same information as your competitors?

Looking beyond your backyard gives you the benefits your company needs. When the governor threatens to outlaw septic systems in Maryland to save the Chesapeake Bay, other states in the bay watershed need to pay attention. When Enterprise Cascadia offers a new and innovative way to finance septic systems in Washington through a private nonprofit, are there lessons for your state? Being part of a national network through your NOWRA membership helps keep you in the know. Here are my top six reasons to belong to NOWRA:

1. Come together to accomplish things for the onsite industry
2. Build leadership skills and increase professionalism in the industry
3. Promote your involvement in the industry
4. Build relationships and network
5. Give something back to your profession and the community
6. Get educated on current and future trends

As one person has stated, "Nobody else is going to look out for your profession like your National Association — nobody." The onsite industry is based on laws, standards and regulations. As part of both national and state associations, you are guaranteed a much greater return on investment for yourself, your company and your state.

Jennifer Cisneros is the marketing director for Bio-Microbics in Shawnee, Kan.

Streamlining Rules

Waste Water Nova Scotia held focus meetings with industry professionals around the province to learn which legislative issues needed clarification or streamlining. Members brought their concerns to Blake McDonald, P.E., onsite services coordinator with the Department of the Environment, and are working with him for resolution.

A booth manned by the association at the Halifax Home Show educated attendees about onsite services. Its new self-study training course allows future pumpers and portable restroom operators to work under supervision while becoming licensed. The group also creates videos documenting the installation of different onsite systems.

Serving a Task Force

Alberta Onsite Wastewater Management Association president Dale McLure was named to the province Septage Advisory Committee to help review regulations and propose changes. The organization developed an ad hoc task force with Alberta Municipal Affairs and the Safety Codes Council to address permitting, inspections, and enforcement issues.

Association members want a standardized permitting process and a more efficient and accountable enforcement structure. To raise funds for its education programs and a proposed mobile training unit, the association raffled a new Honda ATV valued at more than $8,000.

On Exhibit

The Saskatchewan Onsite Wastewater Management Association exhibited at the Canada Mortgage and Housing Corp. (CMHC) Convention in Regina to help First Nations communities better understand the design and installation of onsite systems. The association partnered with CMHC and Health Canada to do the training.

Inspection Protocols

Proposed revisions in the Ontario Building Code included inspecting onsite systems near protected waters. The Ontario Onsite Wastewater Association helped develop the procedures and protocols for inspectors. Requirements include liability insurance for inspection of systems.

Fighting Hard

During the last legislative session, the Florida Onsite Wastewater Association (FOWA) worked to educate House and Senate members on the importance of a septic tank evaluation program to replace legislation requiring septic tank inspections every five years. The organization formed a coalition with the Florida Home Builders Association, Florida Association of Realtors, and Associated Industries of Florida to support an alternative bill reflecting its recommendations.

Georgia Officers

Jesse Nix of North Georgia Environmental Services in Cleveland was elected president of the Georgia Onsite Wastewater Association. The board elected John Ford vice president, Matt Vinson secretary, and Mike Fugate treasurer. Kathy Marsh replaced resigning board member Sam Banks.

Biosolids Not Harmful

Maurice Barker, Florida Department of Environmental Protection biosolids coordinator, told the Polk County Commission that land application of treated waste from municipal treatment plants and septic tanks is no threat to health or the environment.

Rules addressing how the material is treated are being revised to include more oversight and restrictions on application sites to prevent groundwater and surface water contamination. George O'Connor, an environmental soil chemist from the University of Florida, said the applied materials are of high quality and cited studies that showed no health effects.

Loretta Firis of the Polk County Health Department, said the county inspects sites twice a year and investigates citizen complaints about odors and other concerns. Commissioners agreed that insufficient policing was the cause of most complaints.

CALENDAR OF EVENTS

Aug. 4-6

Florida Onsite Wastewater Association Conference and Trade Show, Daytona Beach Convention Center, Daytona Beach. 407/937-2228; www.fowaonsite.com.

Aug. 19-20

Georgia Onsite Wastewater Association Conference and Industry Exhibit, Hilton Atlanta/Marietta Hotel and Conference Center, Marietta. 678/646-0369; www.onsitewastewater.org.

TRAINING & EDUCATION

Registered Professional Program

The Ontario Onsite Wastewater Association is an authorized agent for courses required by the Ontario Building Code for onsite installer and inspector certification. The association's Registered Professional Program offers advanced classes on regulatory requirements, installation techniques and new products.

Current accreditation includes Level I, Advanced, and Master for installers, designers, and maintenance providers, and accreditation for government and residential inspectors. Contact Denis Orendt at 905/372-2722 or dorendt@yahoo.ca.

Installation Training

The Pennsylvania Septage Management Association and Pennsylvania Association of Sewage Enforcement Officers are developing an Installation of Wastewater Treatment Systems course using materials from the Consortium of Institutes for Decentralized Wastewater Treatment.

The National Environmental Health Association will administer the certification exam. If the course is approved by the state Department of Environmental Protection, it will qualify for continuing education units. Contact Stacy Henninger at 717/763-7762 or communications@psma.net.

Alabama

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

- Sept. 8-9 – Continuing Education, Florence
- Sept. 21-23 – Basic Installer
- Oct. 6-7 – Pumpers
- Oct. 12-14 – Advanced Installer I
- Oct. 27-28 – Continuing Education, Mobile

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 www.aowatc.uwa.edu.

California

The California Onsite Wastewater Association is offering these NAWT classes:

- Sept. 22-23 – Operation and Maintenance, Part 1, Citrus Heights
- Oct. 6-7 – Septage Treatment Workshop, Sutter Creek
- Oct. 7 – Vacuum Truck Technician, Sutter Creek

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

Florida

The Florida Onsite Wastewater Association Training Center is offering these courses with master credit hours:

- Sept. 7 – Advanced Treatment Systems, Key Largo
- Sept. 13 – Advanced Treatment Systems, Hawthorne
- Sept. 15 – Advanced Treatment Systems, Port St. Joe

Contact FOWA at 321/363-1590 or www.fowaonsite.com.

Georgia

The University of Georgia's College of Agriculture & Environmen-

tal Sciences is offering a Contractors and Pumpers course on:

- Sept. 9 – Dalton
- Sept. 14 – Columbus
- Sept. 21 – Macon
- Sept. 27 – Athens/Rock Eagle
- Oct. 12 – Albany
- Oct. 18 – Dublin
- Oct. 25 – Valdosta

Contact Vaughn Berkheiser, Ph.D., at 770/233-5506 or vberk@uga.edu.

Iowa

The Iowa Onsite Wastewater Association has a Small Community Systems course on Sept. 19 in Ogden. Contact Alice Vinsand at 515/225-1051, execdir@iowwa.com, or visit www.iowwa.com.

Michigan

The Michigan Onsite Wastewater Training and Education Center in Novi has an Onsite System Maintenance course Sept. 28-29. Call Barb DeLong at 517/355-4720 or visit www.egr.msu.edu/age/outreach.html.

Minnesota

The University of Minnesota Water Resources Center has these classes:

- Sept. 8 – Soils Continuing Education, Brainerd
- Sept. 27-29 – Advanced Design and Inspection, Part 1, St. Cloud
- Oct. 18-21 – Advanced Design and Inspection, Part 2, St. Cloud

Call Nick Haig at 800/322-8642 or visit www.septic.umn.edu.

Missouri

The Missouri Smallflows Organization is offering these CEU courses:

- Sept. 6 – Drainfields and Water Management, St. Louis
- Sept. 7 – Earthen Structures, St. Louis
- Sept. 27 – Troubleshooting, Springfield
- Sept. 28 – Hydraulics, Springfield
- Oct. 11 – Profitable Business, Camdenton
- Oct. 12 – Troubleshooting, Camdenton
- Oct. 25-26 – High-Strength Waste, Liberty

Call Tammy Yelden 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:

- Sept. 1 – Conventional Onsite Treatment Basics for Installers
- Sept. 15 – Innovative and Alternative Technologies
- Sept. 21 – Conventional Onsite System Inspection
- Sept. 21-22 – Conventional Onsite System Inspection and Field Training
- Sept. 29 – Installing Advanced Onsite Systems
- Sept. 29 – Innovative and Alternative Technology Field Training, Peckham Farm
- Oct. 6 – Bottomless Sand Filter Design and Installation
- Oct. 13 – Functional Inspections

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

North Carolina

North Carolina State University has the following courses:

- Sept. 1 – Wastewater in the Environment, Concord
- Sept. 7-8 – Introductory Installer, Mills River
- Sept. 9 – Installing Pump Systems, Mills River
- Sept. 14-15 – Subsurface Wastewater System Inspector, Greensboro
- Oct. 25 – Soil Profiling for Wastewater and/or Stormwater Handling, Wilmington
- Oct. 27 – Installation of Advanced Systems, Wilmington

Call Joni Tanner at 919/513-1678 or visit www.soil.ncsu.edu/training.

North Carolina Septic Tank Association has the following classes:

- Oct. 20-21 – Installer/Inspector, Hickory
- Oct. 26-28 – Installer, Inspector, Pumper, Land Application, Greensboro

Visit www.ncsta.net or email ncsta@earthlink.net.

Pennsylvania

The Pennsylvania Septage Management Association is offering these Onsite Wastewater Treatment System Inspection courses:

- Sept. 13-14 – Basic and Advanced Onsite Treatment Inspection Certification, Montoursville
- Oct. 5-6 – Confined Space/Competent Person Training, Stroudsburg

Call 717/763-7762 or visit www.psma.net.

Utah

Utah State University has these On-Site Wastewater Treatment Training Certification Workshops on:

- Sept. 12-13 – Level 1, Heber City
- Sept. 14 – Renewal Level 1 Certification, Heber City
- Sept. 15 – Renewal Level 2 Certification, Heber City
- Sept. 28-29 – Level 2, Logan
- Oct. 11-13 – Level 3, Logan
- Oct. 19 – Renewal Level 3 Certification, Logan

Call 435/797-1000 or visit http://uwrl.usu.edu/partnerships/training/classes.html.

Virginia

The Virginia Center for Onsite Wastewater Training has these classes:

- Sept. 5-Nov. 11 – Nitrogen Dynamics, Online Course
- Oct. 3-7 – System Design Camp I, Pickett Park

Contact Lydia Shepherd at 434/292-3101, email lydia.shepherd@southside.edu, or visit www.southside.edu. ■

SJE-Rhombus Receives Wellness Award

SJE-Rhombus received the Wellness in the Workplace Award from the Detroit Lakes Minnesota Chamber of Commerce for creating a wellness program that focuses on achievement awards and promoting health, safety and wellness among employees. SJE-Rhombus also received the 2011 Wellness by Design Award from the Hennepin County Human Services and Public Health Department.

NOWRA, Wells Fargo Offer Interest Rate Discounts

NOWRA has partnered with Wells Fargo to provide members with discounts on interest rates and document fees for equipment purchases in excess of $50,000. NOWRA members receive a 25 percent discount (25 basis points) off the prevailing interest rate for vehicles or related equipment purchased through Wells Fargo's Specialty Vehicles Division. If the prevailing rate is 6 percent, NOWRA members will be able to apply for a loan at a 5.75 percent interest rate. Wells Fargo also will reduce its document fee charge from $500 to $350. To take advantage of the program, email NOWRA's executive director at wecasey@comcast.net.

Bord na Mona Environmental Products U.S. Changes Name to Anua

Bord na Mona Environmental Products U.S., manufacturer of wastewater treatment, water reuse and VOC/odor control systems, changed its name to Anua (ah-noo-ah). The company's new name comes from the Irish word athnuaig, meaning renew. Headquartered in Greensboro, N.C., and a subsidiary of Bord na Mona plc, the Anua name reflects a renewed commitment to providing sustainable products for communities, municipalities and industries. ■

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VFC200P-5T, FUJI Pumps, Regenerative Blowers, Ring Compressors. All models, accessories. Authorized distributor. Authorized parts and repair center. Call 888-227-9822. www.carymfg.com. (IBM)

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Established excavating/septic installer business for sale. Shop, tools and 11 makes of heavy equipment. N. Virginia. $385,000. Email bucksorso@yahoo.com. (I08)

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WANTED: Looking to acquire septic businesses in Massachusetts. All inquiries will be confidential. 508-868-7627. (IBM)

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