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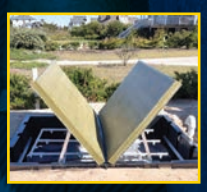

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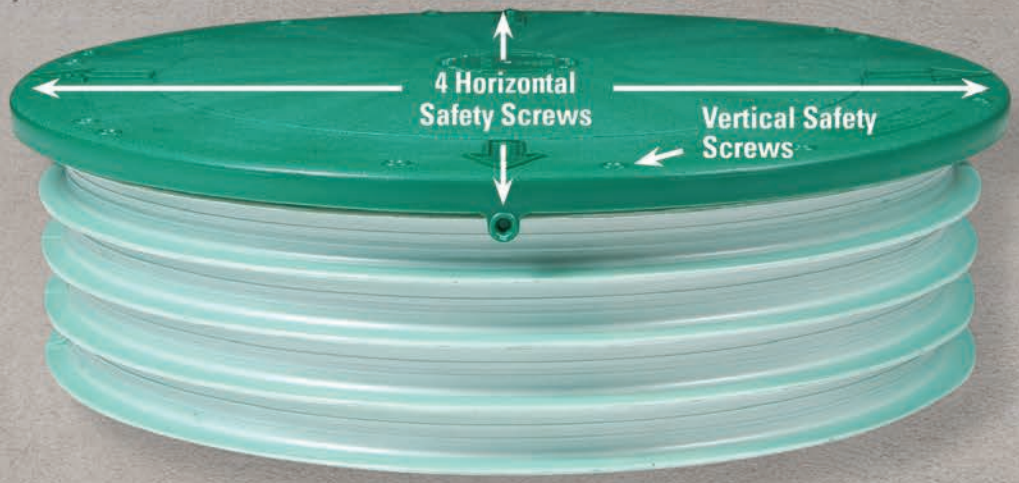

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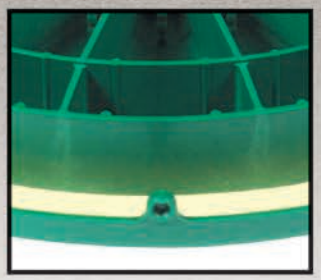

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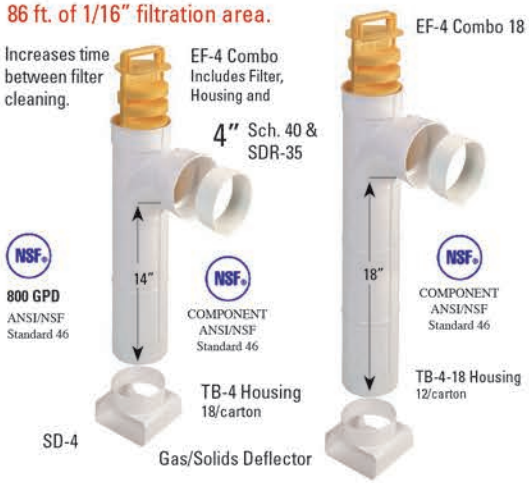

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By David Steinkraus

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Mike (left) and Steve Barry are the father-son management team behind AQWA Inc. in Wilson, North Carolina. Mike is the chief operating officer and vice president and Steve is CEO and president of the North Carolina company founded in 2002 (Photo by Gray Whitley)

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ISSUE FOCUS: Pumps
Snapshot: Raising industry image in Ohio
Contractor Profile: Visiting Alaska

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ADVERTISER INDEX

August 2022

Enjoy this issue!

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

Jim Kneiszel

Send your comments, questions or opinions to Jim Kneiszel at editor@onsiteinstaller.com

The Goal of Proper Onsite Maintenance Is in Our Grasp

Don't let septic system users become pennywise and pound foolish by fighting mandated inspections

Nobody argues when you promote the concept of cleaner water and the proper handling of wastewater. Folks are supportive of making sure the water we drink is safe and that onsite systems carry household wastewater away so we never have to smell it or see it.

But if how we ensure safe water and wastewater systems starts to cost a little money, well, that's a different story. Then, suddenly the issue isn't quite as universally important as we thought it was.

For example, when the majority of the Warren County, New York, Board of Supervisors recently expressed support for a proposal to require onsite inspections for properties located within 250 feet of several pristine lakes, online readers at the poststar.com newspaper were quick to object.

"This is only the beginning of the environmental overreach by the county … Who knows when will it end? This is only the start of the elite class enforcing their will on a local population that prefers minimal government intrusion," wrote one reader.

"I totally support less pollution, cleaner waterways, etc. I am suspect, however, with the county board of supervisors' proposal of 'septic inspections.' Whenever a government entity singles out one faction of a problem for 'enforcement,' it usually involves an underlying agenda. I'm sure septic pollution into our waterways does exist … the scope of which is difficult to determine because it is unseen," writes another.

A REASONABLE PLAN

In this same area of upstate New York, the Lake George Park Commission is promoting what I would consider a very reasonable mandated inspection program for 3,400 properties in what is deemed the most sensitive areas surrounding Lake George. A working committee of the commission is eyeing an estimated $50 annual fee to cover the cost of a septic inspection. A pumpout would also be required every five years, with that cost presumably covered by the property owner.

"I see a regulation in the future that's going to be adopted by everybody. The only person who will be bothered by this will be the one who says, 'What septic system are you talking about?'" Commissioner Ken Parker was quoted in the local *Times Union* newspaper. Added the commission's executive director, Dave Wick, "We are trying to do the right thing to be protective of the lake and not overly burdensome on the regulated public."

Certainly there is a good-sized upfront cost for decentralized wastewater treatment — and doubtless that cost keeps rising with inflation, higher labor costs and better treatment technologies employed. But folks stick their heads in the sand mound if they think these systems should operate effectively with no ongoing maintenance.

Installers know that homeowners who ignore their systems will pay for that neglect in the long run. If users don't empty the sludge, clean filters, inspect pumps and pipes on a regular basis, these expensive systems will ultimately fail. And we know all too well that many perturbed septic system owners will blame the installer or the components used for the failure.

Folks stick their heads in the sand mound if they think these systems should operate effectively with no ongoing maintenance.

BRING UP COSTS

It's always a difficult conversation to explain the many root causes of the abuse that led to system failure. Those often include ignoring recommended maintenance, putting the wrong things down the household drains, such as fats, grease, wipes, etc., and overuse of systems by adding rooms or permanent residents to the house without considering changing treatment capacity needs.

Placing the blame squarely where it belongs can be a fruitless endeavor. If they hear you, they may not believe you. And they are more likely not to hear you — just like when they ignored your usage instructions when their systems were installed.

One way to encourage onsite users to accept required or voluntary maintenance programs is to stress the value they received from decentralized wastewater treatment. That's what public health officials in Mahoning County in Ohio are doing now as they enact local maintenance

programs to comply with 2015 state of Ohio updated onsite regulations.

As spelled out by the health department, Mahoning County residents will be charged between $30 and $125 per year to obtain permits for their onsite systems. The Level 1 maintenance fee of $30 is for owners of a conventional septic system and the cost goes up with the complexity of the treatment system. The county figures the average cost of pumping once in three years is $350, making a total annual cost for wastewater treatment $146.67, or $12.22 per month.

Then the county outlines the typical cost of municipal sewer service in Ohio. It states the average household with four residents uses 10,000 gallons of water per month, at a rate of $12.30 per thousand gallons for wastewater treatment. That comes out to a cost of $1,614.60 per year, or $134.55 per month.

BANG FOR THE BUCK

So despite any complaints about mandated inspection and pumping, it's easy to see that a well-maintained septic system presents a real bargain. And it should be easy to explain the math for your onsite system customers.

As proven and competent installers and maintenance service providers, you are in the perfect position to deliver this important message to consumers. And don't be shy about it. After all, I'll go back to what I said at the beginning. We all want cleaner water and safe wastewater treatment. It's our job to explain to the layman what it takes to achieve those goals.

DROP US A LINE

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

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SYSTEM PLANNING

Evaluating the Soil and Site

The site planning series continues with an article covering the soil and site evaluation report, hydraulic and organic loading, and treatment train components design. Identifying some of these critical items during the review and bidding process can help avoid problems and make for a smooth installation. onsiteinstaller.com/featured

SOCIAL MEDIA TIPS

Engaging with Customers

With new social media platforms popping up all the time, it's easy for business owners to get overwhelmed. Where should you invest your time and resources into marketing your business? Do you really need to have a presence on every single platform out there? This article lays out eight post ideas to help you engage potential customers, market your business, and build trust and brand awareness. onsiteinstaller.com/featured

Overheard Online

"The cloud offers greater scalability, including auto-scaling, and also offers better performance and the best balance of performance and infrastructure costs."

— Benefits of Storing Your Business Data in the Cloud
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INCREASE LOYALTY

How to Train Your Customers

When you run a business, you devote a lot of time to training and educating your employees. What's often overlooked is the need to train and educate *customers*. And yet, customer training is one of the most effective things you can do to boost customer loyalty and retention. If customers know how to get the utmost value from their onsite system, they'll be more loyal, and more likely to recommend your business to friends. This online article shows you how to get started. onsiteinstaller.com/featured

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SERVICE AFTER THE SALE

North Carolina's AQWA Inc. secures an ongoing revenue stream through great service of the wastewater equipment it sells

By David Steinkraus

Technician Jonathan Handley inspects an effluent filter that is part of an Orenco Advan-Tex treatment system in Zebulon, North Carolina. (Photos by Gray Whitley)

The AQWA team includes, from left, Steve Barry, Mike Barry, David Parker, Paul Smith, Chris Taylor, Jonathan Handley, Jeff Cranmer, Tammy Riggan, Chad Allen, Kevin Johnson, Patrick VanHook, Michael Clayton, Ethan Barry, Stuart Webb, Eric Barry, Rebecca Barry, Denise Barry and Karie Bolton.

AQWA Inc.
Wilson, North Carolina

Owners: Steve and Mike Barry
Founded: 2002
Employees: 18
Service area: North and South Carolina, Virginia
Services: Sales and service of wastewater treatment equipment, some general contracting for large projects
Associations: North Carolina Septic Tanks Association, North Carolina Rural Water Association, South Carolina Rural Water Association, Virginia Onsite Water Recycling Association
Website: www.aqwa.net

What began as a father-son talk about post-retirement careers took form as a new family wastewater business. Twenty years later, father Mike and son Steve Barry can look back on, and look forward to, a thriving and growing operation based in Wilson, North Carolina, and extending into neighboring states.

Mike knew change was coming with his retirement as an Army colonel in 2002. "Denise and I had been traveling the world for 30 years. We were looking to settle down somewhere," he says.

"Years ago I had started a career as a county health inspector in Tampa," Steve says. Just before Mike retired, Steve moved into the private wastewater industry, saw the treatment systems under development and realized the expanding potential of onsite technology.

"We had talked about any kind of business, but particularly trying to establish a family business. That was the key factor," Mike says.

"He wanted to do something with me and a family business as opposed to some consulting job somewhere in D.C.," Steve adds.

They started with a black marker and a piece of butcher paper on the floor of an apartment in Raleigh, North Carolina, Mike says, and they mapped out what their organization would look like and where it would be focused.

WORKING KNOWLEDGE

Mike is originally from Decatur, Georgia. He graduated from Georgia State and earned a master's degree in operations research engineering from the Florida Institute of Technology. As an Army officer he was assigned to the U.S. Southern Command in Miami at the end of his career and was involved in the overall development of Army facilities. Wastewater was part of facility plans, but he didn't get into the details, "until I got into the business with Steve."

It was Steve, a 1995 Texas A&M graduate, who suggested they look at North Carolina. In his private sector job with a manufacturing company, he became familiar with North Carolina, especially its Atlantic coast. He found people in the state were interested in high-quality work and found state regulators and installers were forward-thinking about the industry.

"Steve talked about the industry and the focus on quality and trying to establish some rigor in the treatment industry for smaller facilities. And that certainly interested me," Mike recalls.

So they started AQWA Inc.

At the time, Steve's brother Mark was living in New York City and

Steve Barry looks over a TCOM custom control panel set to be installed as part of an Orenco commercial wastewater treatment system.

working as creative director for an advertising firm. He designed the business logo, tag line, and helped with some of the early branding.

Work is about 85% residential, meaning a single-family home or a rental home with a relatively low volume of waste, and 15% commercial.

"But those commercial jobs," Steve says, "you only need a few of those, and the revenue starts to dwarf the residential side." Revenue is split about 50-50 between the two types of work.

EXPANDING OPTIONS

The company sells only Orenco Systems equipment for treatment and services about 700 AdvanTex systems across the Carolinas and Virginia. AQWA carries other products, but it is equipment, such as drip irrigation, that supplements the primary treatment system.

"For a long time, we were a residential-focused company," Steve says. Although they wanted to expand their services, that wasn't possible until about the last 10 years when Orenco developed larger systems that allowed AQWA to serve larger commercial customers.

Large onsite systems that the company services can reach 40,000 to 50,000 gpd. Once capacity exceeds 100,000 gpd, an NPDES permit is necessary, Steve says.

"We do a fair amount on the outskirts of some cities. So we'll have charter schools that are just outside of municipal sewered areas, and yet they need a treatment system that can deal with, for example, the high nitrogen that schools can put out," Steve says.

The economic calculation, he says, is always whether the treatment system cost is justified by the land value, and in the Carolinas land values are soaring. Two projects AQWA is working on this year are a pair of mobile home parks where activated-sludge systems are being replaced with AdvanTex treatment systems discharging to a stream under an NPDES permit.

"From the first concept of it, the business was built so that we could sell high-quality equipment that we would then service afterward. So we were going to sell ourselves a fleet to become, essentially, a utility," Steve says.

They may help with installation, and they help with engineering and design, but ultimately the goal is to operate a fleet, he says. This approach helps insulate the company from the cycles of the building market. By the time the Great Recession of 2007-08 came along, only about five years after the business was founded, Steve says, the company was already servicing enough systems to keep its doors open at a time when home construction was in a slump.

TECHNOLOGY EXPANDS TERRITORY

One of the reasons AQWA Inc., of Wilson, North Carolina, can operate across three states is the availability of remote monitoring over the internet.

"It's a great tool for an organization with a substantial regional focus," says Mike Barry, who co-owns the business with his son Steve. "We can do lots from those telemetry systems."

At the same time, the internet is also full of people looking to do mischief or actual harm. There was a widely publicized incident involving a Florida water plant in February 2021. A hacker gained access to the plant's computer system and for a few minutes increased the sodium hydroxide feed to 11,100 ppm from about 100 ppm. A plant technician quickly noticed the change and shut down the feed.

Law enforcement officials later said the hackers gained access through unused remote monitoring software. The plant also used an old and unsupported version of Microsoft Windows on its computers, and all of the computers shared a single password, news reports said.

Software used by AQWA is sent through the cellular phone network, Steve Barry says, and then through servers at Orenco Systems, and doesn't come back into the AQWA network. That adds extra layers of security and doesn't put the AQWA network at risk, he says. And, he says, access is password protected for any sites that can be adjusted through telemetry.

There is risk to using telemetry, Steve says, but ultimately it's outweighed by the benefits.

SERVICE, NOT TERRITORY

"Our growth plans are in terms of services we're providing," Steve says. For example, the company recently acquired a general contractor's license, and Steve's son Ethan recently joined the company with his new degree in mechanical engineering. It's an advantage especially for larger projects, Steve says, because Ethan can talk with partners as one engineer to another.

"The engineering will continue to be engineering support for the engineers we work with," he says. "And the same for the contracting. We see it as allowing some of our existing installer partners to maybe punch a little bit above their usual weight class considering we can bid on some pretty big projects with our unlimited license."

AQWA can serve its territory efficiently in part because of modern telecommunications.

"One of the things we liked about Orenco, when we started working our relationship with them, is they have a tool called VeriComm, which is a web-based system that allows us to remotely monitor our small sites," Mike says. "On the commercial side they've got a little larger system called Tcom, which is a telemetry-based system — and these days it's all cellular-based — that allows us to monitor the commercial sites' performance and collect data."

"My dad and I, we've never really been about growing, per se. We've been about doing things well and doing things the right way, and growth has been just a byproduct of that."

Steve Barry

Kevin Johnson assembles an AQWASTEP street connection used in conjunction with an Orenco Biotube ProPak pump package.

« Jonathan Handley checks a VeriComm control panel that is part of a new Orenco AdvanTex system installed during a residential project.

» In the company shop, Stuart Webb assembles valves used in the Orenco Biotube ProPak pump package. AQWA provides tank adapters, lids and risers for STEP systems.

> "From the first concept of it, the business was built so that we could sell high-quality equipment that we would then service afterward. **So we were going to sell ourselves a fleet to become, essentially, a utility."**
>
> Steve Barry

Technicians still have to make visits. Residences need two visits a year, plus systems in North Carolina need a third visit to collect samples. A route may take a technician to Jackson County in the far southwestern corner of the state (about 350 miles from Wilson) with an overnight stay. The next day could include visiting a couple of residential systems and a commercial system, dropping samples at a lab, finishing the service route and going home.

"They don't physically come into the office except for about once a week to go through their truck, making sure that any parts they've used are replenished, and doing any paperwork and coordination," Mike says.

MOBILE TOOLS

Technicians are equipped with a tablet and Utility Cloud software that keeps the inspection record — time on site, what is accomplished, and any issues that need attention. Hard copy reports generated from the software are sent to customers through the mail.

One advantage of a large service area, Mike says, is technicians can be rerouted to keep them safe and productive. When a powerful storm with snow and sleet swept through the South in January, technicians were sent toward the coast where precipitation fell as rain.

"We try to be flexible to do that. Sometimes we get in a bind with an alarm," Mike says.

If there is an alarm, they may first look for help from someone on site, he says. The AQWA representative will ask the person to go to the control panel and instruct them how to send a diagnostic message to the company office.

"I'd say 50% of our alarm calls tend to be something like a toilet running, or maybe a (circuit breaker) in the electrical panel," Mike says. Sometimes those problems can be resolved using telemetry, he says, but if a technician has to go, then a technician goes.

"But you'd be surprised at how much we can catch with the telemetry," Steve says. Given the wastewater capacity in most systems, alarms typically don't require immediate attention, he says, but can wait until a regular business day.

BUILDING AHEAD

Another arm of AQWA is light fabrication. That consumes the full-time attention of a lead technician and an assistant. Much of this is building headworks.

"We'll order the equipment from Geoflow, Netafim USA, or others, then we'll put everything together in a riser or a basin," Steve says.

In the last three to four years the company has been building STEP packages. Those start with a plastic tank from Roth Global Plastics.

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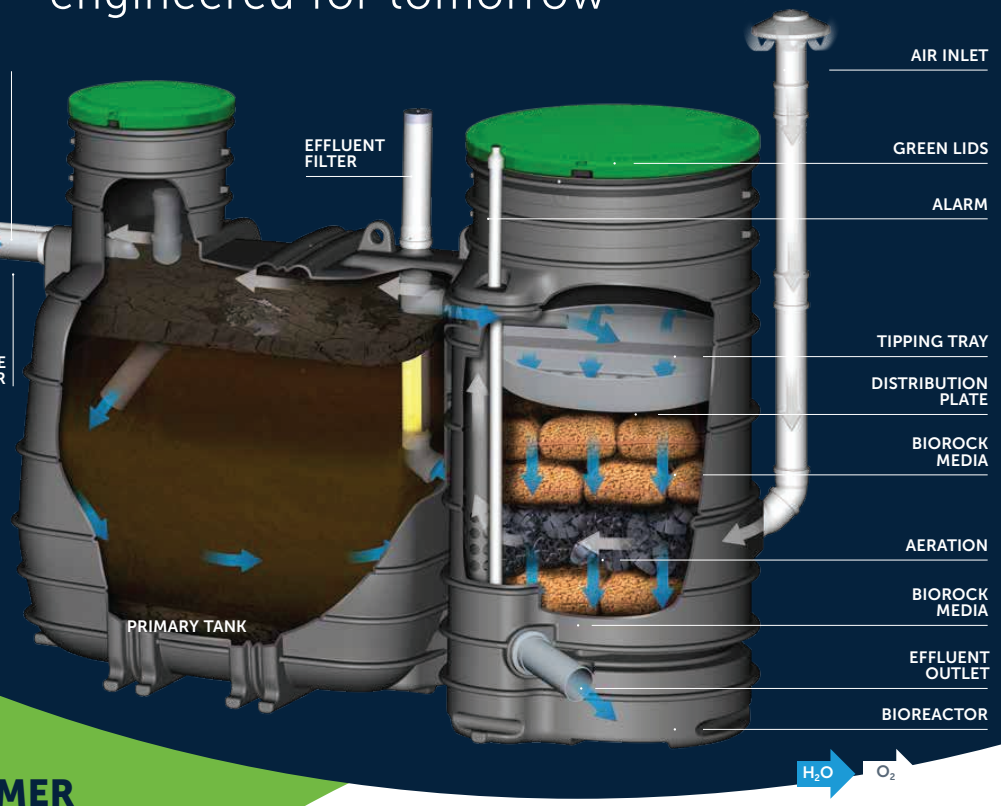

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Sales Manager Michael Clayton, left, and Kevin Johnson, vice president of manufacturing, discuss a project at the AQWA offices.

Tammy Riggan, operations manager, leads a morning meeting with the AQWA team.

AQWA adds risers, components from Orenco, and ends by installing a full-length lead of flex conduit connected to a control panel that its technicians wire.

"So everything is plumbed in and stubbed out. The pumps are in. The floats are set," Steve says. All an installer has to do is set the tank, mount the control panel and have the builder run power into it. "We've got a few subdivisions and a few utilities that are steadily using that now whenever they need a pressure sewer as an alternative to grinder packages."

RELATIONSHIP BUILDING

Work comes through engineers whom AQWA has developed relationships with over the years. They'll outline a project they have and ask what the Barrys think about various solutions.

"When we first started, we banged on doors. We made sales calls to engineers and installers — and had plenty of doors slammed in our face," Steve says. "We also did a lot of trainings where we would teach people about how to design a system, for example, or how to permit the system, why these systems were the way to go.

"We tried to make ourselves invaluable. While there was a high cost of acquisition of those customers, we were hoping to retain them with the quality of work and equipment that we provided," he says. Trainings still happen, and face-to-face help will never go out of style, he adds.

Michael Clayton, the company's sales manager, is a resource to customers, and that type of service also won't go out of style, he says. At the same time, he adds, Clayton is a millennial and thoroughly understands how to use the internet. The company has worked hard to develop its online presence, Steve says, and as a result, AQWA gets most leads that way now and can then bring in its partners — the engineers, soil scientists and installers it has built relationships with.

AQWA is in its third location and has been there for 10 years. That will change in the near future. In terms of layout, the present building is perfect, Steve says, but it has become too small, and its city lot is too small for expansion.

They want to at least double the size of their present facility, either by finding a new building or building their own solution. More space will make it harder for people to keep up on what other staff members are doing and to offer ideas, Steve says, but team members are starting to trip over each other.

More space is definitely needed for fabrication, and a bit more for offices, Steve says. He'd like a little more room for equipment because the company has a couple of jobs under its general contractor license. "I think we're going to bring a trencher in, and we may get to the point of a little mini-ex or a portable generator — tools for the job that most contractors have from the start we're just starting to accumulate," he says.

> "The ability to sewer every road and subdivision in the Carolinas or Virginia, or anywhere, is a pipe dream. Not only is it a pipe dream, it is also, I contend — and I'll always contend — poor thinking."
> **Steve Barry**

HIRING RIGHT

As an operations company, AQWA works without the usual yard full of heavy equipment.

For service calls, technicians are equipped with an assortment of hand tools. One particularly valuable tool, Steve says, is a turbidity meter. That simple tool can quickly tell a technician about the state of media filters in an AdvanTex pod, he says.

With a couple of exceptions, the company uses only Ford F-150 pickups with camper shells or boxes to hold tools and parts. Most of trucks are XL work trucks. A couple have four-wheel drive, which is

handy at some sites in the mountains and along the Atlantic coast.

The AQWA team includes Steve Barry, CEO; Becky Barry, bookkeeper; Mike Barry, chief operating officer, and Denise Barry; Kevin Johnson, vice president of manufacturing; Michael Clayton, sales manager; Tammy Sanders, operations manager; Patrick Vanhook, project manager; Karie Bolton, administrative assistant; Ethan Barry, engineering support; and operators Chad Allen, Jonathan Handley, Jeff Cranmer, Chris Taylor, David Parker and Paul Smith.

Recent staff additions were Vanhook to superintendent jobs, Ethan Barry for engineering, and Bolton to handle office work. Given the pace of growth, Steve says, it's likely the company will be looking for more people in the near future.

The strength of its team is one of the company's advantages, Steve says. "You make a lot of mistakes along the way when you've been in business for 20 years, but one of things I think we've done right is hire great people."

And in return, he says, the company makes sure to do right by employees. "They give a lot to us, and so we want to make sure we return that to them," he says.

ONSITE INSIGHT

While many parts of Florida are busy with septic-to-sewer conversions, the onsite industry in the Carolinas and Virginia is alive and strong, Steve says.

"The ability to sewer every road and subdivision in the Carolinas or Virginia, or anywhere, is a pipe dream. Not only is it a pipe dream, it is also, I contend — and I'll always contend — poor thinking," he says. Sewer system failures can be catastrophic, whereas an onsite failure requires a simple replacement at a single home or requires a larger treatment system.

The coast of North Carolina is fairly unique because it is not sewered, yet it is dense. It is an area that requires systems more complex than a conventional septic tank but simpler than a municipal system. "That niche is where we live. And you need to do it well, and continue to do it well, or else somebody's going to come along and say, 'Well, we need a sewer,'" Steve says.

Their company, he says, is engaged in a balancing act to provide systems that allow development without promoting overdevelopment.

"This our 20th year," Steve says. "Every year we have an end-of-year party, and we do some evaluation and some remembrance, but this year is definitely a special one.

"My dad and I, we've never really been about growing, per se. We've been about doing things well and doing things the right way, and growth has been just a byproduct of that."

Significant Dumping Fee Increase Reversed For New York's Catskill Mountains Region

By David Steinkraus

Septage dumping costs in the Catskill Mountains of New York will remain the same because a New York City agency reversed an earlier decision to curtail the amount of septage it accepts.

Earlier in the year, the city's Department of Environmental Protection decided its wastewater treatment facilities in the Catskills would accept only 26,000 gallons of septage per week instead of the current 71,000 gallons, reported the *Albany Times Union*. In April, Paul v. Rush, the department's deputy commissioner, wrote a letter saying the city would continue to accept the larger volume of waste for the time being.

The city department has accepted septage from residents and municipal septic districts in the Catskills since 2016 because of a memorandum of understanding with Catskills communities. In exchange for accepting septage, the city was allowed to buy land to protect water quality in its Catskills reservoirs. The city now owns about 200 square miles of land.

Catskill Watershed Corp. runs the septage program, and Jason Merwin, its executive director, said the reduction in septage volume was intended in part to allow the department to compost solids at wastewater plants. But without the ability to dump septage locally, he said, pumpers would have had to make 160-mile round trips to Albany. A Greene County Legislature committee said the cost of pumping a tank would have increased from about $300 to about $1,000.

Despite the city's reversal of its earlier decision, Assemblyman Chris Tague (Republican Conservative Independence Party-Schoharie) said the issue is not gone. "I think this is an easy quick fix, and I think [the DEP and the CWC] are going to have to continue to meet and come up with what they're going to do in the future."

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Suffolk County Executive Steve Bellone and other officials said the IRS has failed to stop taxing homeowners for the county grants used to upgrade their onsite systems.

Bellone urged the IRS to reverse its 2020 ruling that said grant money counts as income because grants were not based solely on need and because homeowners exercised some management of the payment. As a result, said one news report, some homeowners saw their tax bills increase by as much as $8,000 while others chose not to participate in the grant program because of the potential for taxation. Bellone said the IRS had agreed to end the taxation last year and has failed to do so.

The county occupies the eastern tip of Long Island, and the grant program began in 2017 as part of the effort to combat nitrogen pollution along the county's Atlantic Ocean coast. The IRS ruled in response to a query from Suffolk County Comptroller John Kennedy. In 2019 he issued forms declaring the grants are taxable income for homeowners although the grant money was paid directly to installers who paid tax on it as business income.

Minnesota

Waseca County is offering grants to help property owners replace failing onsite systems. Grants will pay up to $20,000 of the cost of a new system. Permit fees and any costs greater than the amount of the grant are the responsibility of the grant recipient.

Among other requirements, systems eligible for replacement must have been rated noncompliant by a certified inspector, the property owner must have a payment plan with an approved contractor, and all work must be done by a certified installer.

Eligibility of property owners is based on income. For example, gross annual incomes must not exceed $41,900 for a family of one, $47,900 for a family of two, $53,900 for a family of three, and $59,850 for a family of four.

• • •

Crow Wing County has $60,897 from the state to help low-income residents deal with failing onsite systems.

Funding will be a 3%, 60-month loan from the Region Five Development Commission. Eligibility for assistance will depend on the cost of the system and household income. Priority will be given to low- and very-low-income people.

Maine

The city council in Auburn delayed a proposed onsite ordinance change for Lake Auburn. Several council members said they were uncomfortable moving ahead on the ordinance without more information from the planning board and from a city consultant, reported the *Sun Journal* of Lewiston.

The proposed ordinance would allow the use of alternative soils in designing systems, which has not been allowed in the lake's watershed and has restricted development there. Officials and city staff say the updated ordinance will result in better performance of onsite systems when combined with newly passed phosphorus standards.

Pennsylvania

Supervisors in Watts Township approved an ordinance requiring landowners to pump out and inspect their septic systems every three years.

One-third of property owners will receive notices this year requiring them to hire a licensed pumper to clean and inspect their system. Of the first 222 lots, 157 need the cleaning and inspection, said Jerry Spease, the

township engineer. The next third of property owners will receive notices next year, and the final third will receive them in 2024, reported the *Perry County Times*.

If a system was inspected in the year prior to the notice, the owner may obtain a waiver until the next three-year cycle is due.

Idaho

The Rigby City Council voted to increase septage dumping fees at its wastewater plant by 13% in each of its waste categories. It has been four years since the last fee adjustment, said Scott Humphries of the city wastewater treatment plant.

At a public meeting, no one spoke for or against the increase, reported *The Jefferson Star* of Idaho Falls.

When the city reaches the point of upgrading the plant, the fee will increase again, Mayor Richard Datwyler told the newspaper.

Indiana

The Great Lakes Community Action Partnership is offering low-interest loans to Indiana property owners who need to upgrade failing onsite systems.

Loans may be for amounts up to $15,000 and have a maturity of 20 years and an interest rate of 1%. Applicants must own the home or be in the process of buying it, reported the *News and Tribune* of Jeffersonville, Indiana.

Money is also available from the U.S. Agriculture Department Rural Development agency. The 504 loan program offers a 1% interest rate and 20-year maturity. The 504 grant program is for the removal of health and safety hazards if one applicant is age 62 or older, and the 502 loan program has a 33-year maturity with higher interest rates and a higher household income limit.

Virginia

People in parts of the Chesapeake Bay counties of Gloucester, Middlesex and Mathews are eligible for grants to help pay for onsite system repairs, inspections and replacements.

Money comes from the state Department of Environmental Quality and is intended to reduce bacterial pollution that has reduced shellfish harvests in the Piankatank River and around Gwynn Island.

Grant funds will cover 50% of the cost of onsite system inspections and maintenance, repairs, and installation of a conventional or advanced treatment system to replace a failing system. People living on Gwynn Island and in the Piankatank River and Milford Haven watersheds are eligible for grants. There is no income limit for receiving a grant. ◻

"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.

Jim Anderson, Ph.D., and Dave Gustafson, P.E., 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. Readers are welcome to submit questions or article suggestions to Jim and Dave. Write to ander045@umn.edu.

School Customers About Onsite System Freezing Issues

Sure, it's the middle of summer. But it's a good time to prepare yourself for inevitable questions about frozen pipes.

By Jim Anderson and Dave Gustafson

Our first principle for a good sewage treatment system has always been to keep the system as shallow as possible. The reasons? This is usually the best part of the soil for final dispersal and treatment of sewage effluent, and it keeps the system away from potential problems encountered as the installation goes deeper. These problems include bedrock (impermeable or creviced), dense soil layers and water tables (perched or regional).

We have received several emails asking whether having shallow systems results in problems due to freezing. Our answer is always the same: Not if systems are installed properly. Embedded in the most recent emailed freezing questions were statements indicating the writer had done some reading about systems, but clearly had ideas about how they work or don't work. Some of the ideas were accurate, some not so much. So it's a good time to review aspects of installation to avoid problems due to freezing.

The reader started off with one of the most common misconceptions about system operation. They recognized that bacteria action in the septic tank generates heat which helps keep systems from freezing. Bacteria in the tank do not generate heat. Rather, the temperatures in the tank are related to the temperature of the sewage delivered to the tank. What is true is the bacteria at higher temperatures are more efficient at breaking down the organic solids in the tank. The same is true in the soil. At about 40 degrees F, bacteria basically shut down.

PART-TIME RESIDENTS

For systems in continuous operation during the cold months, a daily supply of wastewater will be delivered from the house, including hot water from showers, dishwashers and clothes-washing. This helps maintain tank temperatures even if the tank has a shallow 1-foot cover. In far northern areas where temperatures can drop to 30-40 degrees F below zero for extended time, the tops of the tanks are often insulated by laying sheets of foam insulation suitable for earth burial.

One issue we have seen more often in our northern lakes areas are problems with freezing in the tanks and backups. These are vacation homes where owners visit only occasionally during winter months. Our recommendations are to insulate the tank and, where possible, have a neighbor or management personnel visit the residence every week and run dishwashers or washing machines through a cycle or two to add heat to the systems.

Freezing in the piping between system components is often due to improper pipe installation. Remember that sewer piping should be empty between water use events. In PVC piping 3-6 inches in diameter, the minimum slope for the piping is 1/8-inch per foot to move solids and liquid through the pipe. If this is done through proper pipe bedding without any bellies or low spots, there should be no freezing problems even if pipes are only 1-2 feet below the surface. This is just good installation practice; not anything special to prevent freezing.

For the house sewer line, it is always good practice to install a bidirectional clean-out outside the house that is accessible to a service provider. This way blockages can be jetted without having to go inside the house.

STOP PESKY LEAKS

For the house sewer line, it is always good practice to install a bidirectional clean-out outside the house that is accessible to a service provider. This way blockages can be jetted without having to go inside the house.

The reader did recognize one very important aspect to avoid, having a trickle of water versus an influx of a larger volume such as from a toilet flush or delivery of water from a dishwasher or washing machine. They were correct in recognizing any dripping faucets or leaky toilets could cause freezing problems in the piping. In addition, furnace condensate should not be delivered directly into the sewer piping, but rather be collected in some type of sump and delivered periodically by a small pump into the piping. If there is a sump to collect wastewater from a basement or lower level, the condensate should be delivered to the sump.

Pipe needs to be insulated if installed under traffic areas such as driveways, walkways or any area where there will traffic of any kind. This thought was brought home to us when we were doing some system research on freezing and we used the same path to take our equipment out over the supply pipe to the dispersal area to measure temperatures. Temperature in the soil treatment area was fine but we caused freezing in the supply pipe. An embarrassing moment for us, and luckily we were working with an understanding homeowner.

Just to reiterate what we have said about insulating pipe in the past, insulated pipe can be purchased. It is basically a pipe within a pipe with foam insulation between the pipes. By sleeving a smaller diameter pipe inside a larger diameter pipe, a level of insulation can be obtained with the air space. Sheet insulation suitable for soil burial can be installed over the piping, or in extreme conditions sheet insulation can also be placed along the walls of the trench when the piping is bedded.

A final word: With the advent of cameras, if piping is installed with bellies, they are found when the service provider cameras the pipe to determine where and why the pipe is plugged. It is best to install the piping properly the first time!

2022 ONSITE installer ATU DIRECTORY

Advanced Treatment Units and Other Onsite Treatment Systems

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS IN
BioMicrobics, Inc. 16002 W 110th St. Lenexa, KS 66219 913-422-0707 sales@biomicrobics.com www.biomicrobics.com See ad page 8	BioBarrier, BioBarrier HSMBR Membrane BioReactor	500 to 30,000	2009	The BioBarrier and its cousin the High-Strength BioBarrier (HSMBR) are Membrane BioReactors. These systems use ultrafiltration membranes to physically separate contaminants from water, producing a high quality effluent. They are certified to NSF/ANSI 40 class 1, as well as Std 245 (nitrogen reduction) and Std 350 for water reuse. Applications for the BioBarrier and HSMBR include residential and commercial, from single homes up to small communities or businesses. Specialty applications include wineries, slaughterhouses, and other high-BOD contexts. The BioBarrier systems are especially valuable for reducing the size of a drain field in smaller suburban lots, and for producing effluent that can be used, e.g., for irrigation.	
	SeptiTech STAAR Trickling Filter Wastewater Treatment System	500 to 27,000	1996	Designed for both domestic and commercial wastewater, the SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculation) Filter Systems can treat from 100 gpd to 27,000 gpd. The biological trickling filter achieves low levels of nitrate and with lower operating costs and power requirements than competing products. All below-grade system components fit in readily available concrete, plastic, or fiberglass tanks. The system is suitable for areas where large tracts of land are not available for land-intensive wastewater treatment systems. Especially appropriate for environmentally sensitive areas, the STAAR system reduces BOD5 and provides for efficient nitrification and denitrification.	Global
	MyFAST Wastewater Treatment System	10,000 to 2 million	1996	Engineered to fit applications of 10,000 to 2,000,000 GPD, the MyFAST (and larger MacroFITT) Wastewater Treatment System uses multiple biological and physical processes to treat wastewater. Ideal for residential (multi-family properties, clustered subdivisions, and small municipalities) and high strength commercial applications, FAST (Fixed Activated Sludge Treatment) is simply great technology: easy to install, easy to operate, always reliable. The proven process of attached growth combined with robust aeration makes the patented FAST system technologically innovative and extraordinarily consistent. Decades of field performance show that FAST systems reduce nitrogen levels – including nitrates and other nitrogen compounds – at high percentages.	
BIOROCK 685 John B Sias Memorial Pkwy., Ste. 330 Forth Worth, TX 76134 817-727-8227 wwilliams@acuantia.com www.biorock.com See ad page 15	Acuantia BIOROCK - ECOROCK	450 to 750	2022	The ECOROCK is a small-sized wastewater treatment plant designed to be retrofitted to an existing primary tank for small to large sized homes. The ECOROCK-system functions as a two-stage treatment plant. The raw sewage first enters a Primary tank to provide preparation and initial breakdown of organic solids. The wastewater then passes into the ECOROCK unit through an effluent filter before discharging into drainfield. ECOROCK is an ideal product to help lower effort and cost for repairing an existing unit.	US
Delta Treatment Systems 9125 Comar Dr. Walker, LA 70785 800-219-9183 • 225-665-6162 info@deltatreatment.com www.deltatreatment.com See ad page 3	Whitewater DF	500 to 1,500	1993	The process occurs entirely within the self-contained treatment unit which is comprised of outer mixing tank and a cone-shaped settling chamber. Raw, unsettled domestic wastewater enters directly into the mixing tank where mixing occurs through an air distribution system. The mixed liquid then enters the settling chamber from the bottom. The settling chamber maintains a quiet condition which allows solids to settle down and re-enter the mixing chamber for more processing. The liquid from the ANSI/NSF 40 certified system is hydraulically displaced upward and is discharged as a clear, odorless treated water which meets or exceeds state water quality standards.	AL, AK, AZ, BC, BWI, CA, CO, FL, GA, HI, ID, IL, IN, IA, KY, LA, ME, MI, MD, MN, MO, MS, MT, NC, NM, NV, NY, OH, OK, ON, OR, TN, TX, UT, VA, WA, WI, WV
	ECOPOD	500 to 250,000	2006	The ECOPOD Advanced Wastewater Treatment System is a FFBR (fixed film bioreactor) system that houses an engineered PVC media specifically designed to treat domestic wastewater. Five models accommodate daily flows ranging from 500 to 1,500 gpd, with customizable options available for commercial applications up to 250,000 gpd. The ECOPOD is ideal for individual residential installations, cluster designs, and small-to-medium commercial wastewater treatment applications. Self-contained, it can be inserted into a standard-sized septic tank or vault providing quiet, odorless operation. ECOPOD is certified to ANSI/NSF International Standards 40 and 245, FHA and VA acceptable, and suitable for intermittent usage.	
	Enviro-Aire Package Plant	500 to 1,500	2005	The Enviro-Aire Package Plant consists of a three-step process to treat incoming wastewater. Raw wastewater enters the unit from a residence or facility. The first chamber is the primary chamber which separates the sludge (gross solids) and scum (floating solids) from the raw wastewater. Effluent then enters the aeration chamber where aerobic bacteria digest the organic waste. From the aeration chamber, the liquid enters the clarifier chamber, where additional water-solids separation occurs. Settled solids return to the aeration chamber for additional aerobic digestion. The air diffuser within the aeration chamber is a patented design to reduce back pressure on the air compressor and maintain constant, non-clogging air flow. The ANSI/NSF 40 certified system design is easy to operate and maintain and is engineered for low energy consumption.	IL, LA, MS, TX
E-Z Treat Systems, Inc PO Box 176 Haymarket, VA 20168 703-753-4770 Fax: 571-248-8837 www.eztreat.net	EZ 600 EZ 1200 Big EZ 3L Big EZ 4L Big EZ 5L Big EZ 6L	600 1,200 2,425 3,275 4,120 5,000	2000	E-Z Treat is a recirculating synthetic media filter. Certified to NSF/ANSI 40 class 1, 245 (nitrogen reduction) and 350 (water reuse). NSF 350 allows for reuse of treated effluent inside residences and commercial facilities. This ability can be used for non-potable activities such as toilet flushing and unlimited irrigation. E-Z Treat is a scalable treatment system that accommodates designs from one-bedroom residential to 100,000 gpd commercial. System designs include single and mutli - family residences, campgrounds, STEP systems, mobile home parks, schools and strip malls.	US

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS IN
Earthtek 1037 S Park Acres Dr. Batesville, IN 47006 800-972-9940 • 812-528-8784 info@packageplants.com www.packageplants.com	Sabre SBR	10,000 to 500,000	2011	Package sequencing batch reactor in buried fiberglass tanks from 10,000 gpd to 100,000 gpd. Larger systems use above ground bolted stainless steel tanks that are insulated in cold climates. Package includes design, drawings, tanks, pumps, blowers, controls, tertiary filtration, and UV disinfection. Effluent quality less than 10 mg/l BOD and TSS, less than 1 mg/l ammonia and phosphorus. Total nitrogen reduction is also available with effluent quality less than 3 mg/l.	Indiana
	Amber MBBR	1,000 to 500,000	2018	Package moving bed biofilm reactor in buried fiberglass tanks from 1,000 gpd to 50,000 gpd. Larger systems use above ground bolted stainless steel tanks that are insulated in cold climates. Package includes design, drawings, tanks, pumps, blowers, polyethylene media, clarifiers, controls, and UV disinfection. Effluent quality less than 20 mg/l BOD and TSS, less than 1 mg/l ammonia. Can be used for ammonia reduction after lagoons and industrial treatment systems.	Indiana
Eliminite, Inc. PO Box 359 Belgrade, MT 59714 888-406-2289 info@eliminite.com www.eliminite.com	Eliminite Grizzly	Up to 50,000	1997	The Eliminite Grizzly system is designed for large-scale, high-volume, high-strength commercial applications where advanced nitrogen reduction is necessary. The system was originally developed to serve high-altitude commercial and resort developments in the Rocky Mountains where winter temperatures linger at or below 0 degrees F, and seasonal use patterns/dramatic fluctuations in flow and wastewater strength are the norm. It functions with little operator input and simple maintenance. C-Series systems serve high-altitude highway rest areas, resort communities, golf courses, ski areas, mixed-use residential communities, restaurants, RV parks, work camps, corporate retreats, business parks and convenience stores. It is suited for use in multi-stage treatment trains and as a means of reducing waste strength prior to conveyance to municipal treatment facilities.	US
Eljen Corporation 90 Meadow Rd. Windsor, CT 06095 800-444-1359 info@eljen.com www.eljen.com See ad page 43	GSF	Scaleable	1982	The Eljen Geotextile Sand Filter (GSF) is an advanced wastewater treatment and dispersal technology. The GSF system provides treatment and dispersal in the same footprint while keeping installations simple and maintenance minimal for domestic and commercial applications. The system requires no startup period. GSF Modules are uniquely designed to provide vertical surface area and oxygen transfer to support the biological treatment of nutrients and contaminants, increasing the soil's ability to accept effluent and the soil's long-term acceptance rate.	North America and Australia
Fuji Clean USA 41-2 Greenwood Rd. Brunswick, ME 04011 207-406-2927 Fax: 207-406-2929 info@fujicleanusa.com www.fujicleanusa.com See ad page 17	CE Series	500 to 1,350	2006 Japan 2015 US	Fuji Clean's CE model series averages 50,000 systems being installed annually worldwide. The popularity is driven by a one-tank configuration, small footprint (7' x 4' for smallest model), low power draw (1.27kWh/day for most residential systems), easy plug & play installation, simple, efficient O&M and consistent treatment (90-95% BOD and TSS removal). No preceding septic tank necessary. NSF 40 certified. There are no moving in-tank parts. An external air blower (FujiMAC RII) introduces oxygen to aerobic chambers and powers two internal air lift pumps, which manage sludge return and discharge of clean effluent.	
	CEN Series	500 to 1,350	2011 Japan 2015 US	Fuji Clean's CEN technology provides enhanced denitrification into its standard treatment process and produces a consistently high-quality effluent (NSF 40/245 certified: 5 BOD, 6 TSS and 10 TN) from straight septic wastewater – no preceding septic tank necessary. No moving in-tank parts. The CEN5 is compact (about 8' x 4'), lightweight (about 475 lbs), highly maneuverable and features a low power draw (one 80 L/min blower drawing 1.27 kWh/day), plug & play installation and optional wireless telecommunication package that offers both dial and text capabilities. This model series is producing best-in-class denite numbers in multiple U.S. states.	Worldwide, headquarters in Japan, US, Australia & Germany
	Commercial Systems	1,350 to 6,000	2006 Japan 2015 US	Commercial Fuji Clean systems provide all benefits of smaller systems – just scaled up in size. Fuji Clean's largest CE commercial system, the CE6KG, is now available to supplement its existing CE21 (1,900-gpd), CE30 (2,700-gpd) models and CEN21 (1,900-gpd). The CE6KG, which can treat up to 6,000-gpd, uses the same treatment technology, process flow and one-tank structure as the smaller CE systems and can be squeezed into the tightest of commercial sites with a footprint of only 36' x 6.5' (including built-in septic tank). Now available to supplement its existing CE14 (1,350-gpd), CE21 (1,350-gpd), CEN14 (1,350-gpd) and CEN21 (1,900-gpd).	
Geomatrix Systems, LLC 114 Mill Rock Rd. E Old Saybrook, CT 06475 860-510-0730 info@geomatrixsystems.com www.geomatrixsystems.com	SoilAir	1 - 100,000+	1998	SoilAir is a patented technology that intermittently aerates the leach field and the surrounding soils rather than continuously aerating the wastewater in a tank. The soils in the leach field become a massive enhanced treatment system. Since air has 21,000 times the capacity to hold oxygen than water, this process provides unprecedented rejuvenation of failed septic systems, extends the lifespan of new leach fields and enhances treatment. SoilAir is effective at treating high strength wastewater and has been successful at oxidizing ATU sludge out of systems. SoilAir's systems have been extensively tested.	US and Canada
	GeoMat	1 - 100,000+	2005	The GeoMat passive treatment and leaching system is ultralow profile, designed for maximum treatment and infiltration. GeoMat is 1" thick and available in widths of 12" and 39". It is comprised of an entangled filament core, a hydroscopic membrane and an internal gravity or LPP pipe. The shallow burial depth and high surface area to void space ratio of GeoMat results in unprecedented aeration. This increased oxygen results in increased removal of pathogens, B.O.D., T.S.S., and nutrients such as nitrogen and phosphorus. When installed on 6" of specified sand, GeoMat treatment levels have been tested to meet NSF/ANSI Standard 40.	Many States, Contact Manufacturer

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS IN
Jet Inc. 750 Alpha Dr. Cleveland, OH 44143 800-321-6960 • 440-461-2000 Fax: 440-442-9008 email@jetincorp.com www.jetincorp.com See ad page 13	JCP	1,500 to 300,000	1970	Jet's Commercial Wastewater Treatment Extended Air and MBBR Plants are modular in design, can treat flows from 1,500 to 300,000 gallons of wastewater per day and allow for phased build out. This makes it possible for motels, shopping centers, restaurants, and service stations to be constructed along interstate highways far from any town. Factories and Subdivisions can be developed miles beyond sewer lines. Time-tested plants treat wastewater through the performance-proven aerobic digestion process that enables microscopic living organisms to transform wastewater into a clear, odorless liquid. Jet offers assistance with design, engineering, and construction as well as onsite 24/7 tech support, plant start up commissioning and operator training.	
	J-Series	500 to 1,500	1993	J-Series BAT Media Plant is a natural, organic, chemical-free system that uses nature's own resources to reduce wastewater to a clear, odorless liquid in just 24-hours. Employing the patented Biologically Accelerated Treatment process that supplies oxygen to naturally occurring microorganisms found in wastewater. Microorganisms attach themselves to the submerged Jet BAT Process Media, forming a "Biomass" to quickly and effectively treat wastewater. The 700 Series Aerator supplies the oxygen and the mixing that supports our exclusive treatment process, converting wastewater into colorless, odorless liquids and gasses. The J-Series, tested to NSF Standard 40, is available in 500 to 1,500 gpd in concrete and 500 to 800 gpd in a seamless plastic tank. Multiple system control options are available.	Worldwide
	CF-Series	500 to 1,500	2008	Jet's Nutrient Reducing BAT Media Plants offer variable capacity in a NSF-40/245 tested treatment system. The J-1500CF Series provides complete effluent treatment from 500 to 1,500 gpd. The 500 and 800 gpd PLT Series tanks are the lightweight, rotational molded alternative to the concrete J-1500CF Series. The seamless polyethylene tanks are easy to transport and install in the most difficult site conditions. J-1500CF Series utilize the proven 700++ aerator, effluent filter and the Jet 197 Control panel. The 197 Control panel cycles the aerator to reduce the nitrogen by over 60%.	
	R-Series	450 to 1,400	2016	R-Series utilize time proven BAT Media, Jet 700++ aerator and the Illumi-Jet UV Disinfection Unit to meet NSF Standard-350 for applications that require shallow discharge, direct discharge or reuse. The R-Series Plants offer variable flow capacity from 450 gpd to 1,400 gpd in precast concrete and seamless, polyethylene tanks. The polyethylene tanks handle from 450 to 750 gpd that are the lightweight, rotational molded alternative to the concrete version. The seamless polyethylene tanks are easy to transport and install in the most difficult site conditions.	
Knight Treatment Systems 281 Cty. Rd. 51A Oswego, NY 13126 800-560-2454 Fax: 315-343-2941 mark@knighttreatment.com www.knighttreatment.com See ad page 31	White Knight	Scaleable	2010	The White Knight Microbial Inoculator Generator from Knight Treatment Systems offers an enhanced form of aerobic treatment technology that introduces, cultivates and releases selected microorganisms. It is designed to be simple to install in most septic tanks. It can be used to retrofit outdated ATUs and package treatment plants and enhance the performance of community and high-strength wastewater treatment systems in addition to septage processing facilities.	US, PEI, Eastern Caribbean
MST Manufacturing, LLC 31 Affsonso Dr. Carson City, NV 89706 877-473-7842 • 949-297-4590 Fax: 949-916-2093 microseptec@microseptec.com www.microseptec.com	EnviroServer	600, 1,200 and 2,500	1998	The EnviroServer ES is a combination of primary treatment, flow equalization, and secondary treatment by both fixed-growth and suspended-growth aerobic processes. The system consists of five chambers in one compact pre-engineered unit. The first chamber is a primary clarifier, the second chamber is the first aeration zone, the third chamber is the second aeration zone, the fourth chamber is the final clarifier, and the fifth chamber is the effluent chamber where an optional pump(s) and disinfection device may be installed.	Worldwide
Norweco, Inc. 220 Republic St. Norwalk, OH 44857 800-667-9326 • 419-668-4471 Fax: 419-663-5440 email@norweco.com www.norweco.com See ad page 9	Singulair Model 960 and Model TNT (Total Nitrogen Reduction)	500 to 1,500	1996, 2006	The Singulair system is the state-of-the-art alternative to a troublesome septic tank for domestic wastewater treatment. Employing the extended aeration process, the Singulair plant provides flow equalization, pretreatment, aeration, clarification, tertiary filtration and optional chemical addition within a single precast concrete tank. Designed for domestic wastewater flows ranging from 500 to 1,500 gpd, performance of the Singulair system is certified by NSF International (Standards 40 and 245) and the Canadian Standards Association.	
	Singulair Green Model 960 and Model TNT (Total Nitrogen Treatment)	600	2010	The Singulair Green aerobic treatment system incorporates Norweco's advanced aerobic treatment process into a durable, watertight polyethylene tank. It is ideal for new or retrofit applications and can be installed easily in the most difficult jobsite with just a backhoe. Incorporating support ribs and inherently strong arch shape, the durable Singulair Green tank will provide decades of reliable performance. Designed for domestic wastewater flows up to 600 gpd, with treatment performance meeting or exceeding the strictest state and county requirements, Singulair Green is certified by NSF International (Standards 40 and 245).	North America, Central America, South America, Europe, Africa and Middle East
	Hydro-Kinetic	500 to 1,500	2012	The Hydro-Kinetic wastewater treatment system employs innovative Hydro-Kinetic filtration technology to produce the cleanest, most consistent effluent quality available. The Hydro-Kinetic system uses extended aeration and incorporates both suspended and attached growth processes to treat wastewater. The patented Hydro-Kinetic Bio-Film Reactor provides final treatment of the wastewater to a near pristine state. The Hydro-Kinetic system is the only NSF/ANSI Standard 40 and 245 certified residential wastewater treatment system to pass two consecutive tests without performing routine maintenance for a full 12 months. The Hydro-Kinetic system exceeds regulatory standards and is certified and listed to BNQ Standards CAN/BNQ 3680-600 and NQ 3680-910.	

Norweco continued >>

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS IN
Norweco, Inc. 220 Republic St. Norwalk, OH 44857 800-667-9326 • 419-668-4471 Fax: 419-663-5440 email@norweco.com www.norweco.com See ad page 9	Singulair R3 and Singulair R3 Green	500 to 1,500	2018	The Singulair R3 REDUCES water consumption, REUSES treated effluent and RECYCLES water to conserve and recharge our groundwater. It provides the cutting-edge solution to chronic water shortages and reduces energy costs of water and wastewater treatment. The system efficiently treats incoming wastewater to the highest level for restricted indoor and unrestricted outdoor use. With unrivaled performance, the Singulair R3 system exceeds the effluent requirements of NSF/ANSI Standards 40, 245 and 350.	
	Singulair Solar	500 to 1,500	2020	The Singulair Solar system delivers an environmentally friendly solution for onsite wastewater treatment by utilizing renewable solar energy to generate electricity. Solar power is a 100% clean, renewable energy source that offers year round efficiency and reduces your carbon footprint. Singulair Solar technology requires no moving parts, providing quiet, efficient operation with minimal maintenance.	North America, Central America, South America, Europe, Africa and Middle East
	Singulair HK and Singulair HK Green	500 to 1,500	2022	The Singulair HK Green wastewater treatment system is specified in areas that require significant and consistent reduction of Total Nitrogen. This hybrid system combines both suspended and attached growth biological processes to produce superior effluent results with no service requirements for 18 months. The system meets or exceeds rigid regulatory standards and is performance certified and listed to NSF/ANSI Standards 40 and 245. Singulair HK Green achieved astounding certified effluent results of 3.0 mg/L CBOD, 4.4 mg/L TSS and 7.2 mg/L TN, an 84% reduction of TN.	
Orenco Systems, Inc. 814 Airway Ave. Sutherlin, OR 97479 800-348-9843 • 541-459-4449 info@orenco.com www.orenco.com See ad page 7	AdvanTex AX-RT	Up to 750	2000	The AX-RT is a "plug and play" wastewater treatment system that can be shallowly buried and installed right behind a septic tank, as easily as a septic tank. Its compact design fits on small lots and reduces costs for excavation and installation. That means property owners (residential and small commercial) can buy AdvanTex quality at a competitive price. The AX-RT is designed to be easily maintained with an annual service call, thanks to its accessible, cleanable filters and media. And its high-quality, high-head pumps have been known to last over 20 years (as seen in the Elkton, Oregon, sewer system).	
	AdvanTex AX-100	2,500 to 12,000	2002	Orenco's patented AdvanTex Treatment Systems include the compact AX-100, which offers a small footprint, making it a viable option for small sites. It works as efficiently as a sand filter, enabling treatment of high-volume commercial and multi-family flows in tight spaces. The AX-100 is a premanufactured package, including the textile media, and has low maintenance requirements, low power use, and low life-cycle costs. It provides consistent, reliable treatment, even under peak flows, producing clear effluent that's ideal for reuse.	North and Central America, Australasia, Europe, and Africa
	AdvanTex AX-Max	1,750 to 100,000	2010	The AX-Max is a completely integrated, fully plumbed, and compact wastewater treatment system for commercial properties and communities. It's ideal for projects with strict discharge limits, limited budgets, and part-time operators. Like all AdvanTex Treatment Systems, the AX-Max is a recirculating media filter that produces outstanding effluent that's suitable for reuse, with significant nutrient removal. AX-Max systems are highly energy-efficient and require minimal operation and maintenance.	
Presby Environmental 143 Airport Rd. Whitefield, NH 03598 800-473-5298 • 603-837-3826 Fax: 603-837-9864 info@presbyeco.com www.presbyenvironmental.com See ad page 5	Advanced Enviro-Septic	Varies	1995	Advanced Enviro-Septic (AES) is a combined treatment and dispersal system. This effective and non-mechanical onsite system is designed for residential, commercial, and community use. AES has been proven to remove up to 99% of wastewater contaminants without the use of electricity or replacement media. AES does this quickly and naturally establishing multiple bacterial treatment environments throughout the system that break down and digest wastewater contaminants leaving the septic tank. This passive process allows the system to discharge highly purified wastewater, preventing soil clogging and groundwater contamination. AES has third party certifications from NSF, Cebedeau, BNQ, and SAI Global.	Worldwide
Zoeller Pump Company 3649 Cane Run Rd. Louisville, KY 40211 800-928-7867 www.zoellerpumps.com	Z-Cell High Performance Wetland	450 to 36,000+	2001	The Z-Cell technology can be used in residential, commercial, or small community applications for treating residential strength septic tank effluent. The Z-Cell is a timed dose system and the wastewater has a 36" vertical path to an outlet pipe below the wetland's surface. By moving water vertically, the fluid must pass through the horizontally oriented plant root zone. This eliminates short circuiting, an issue common in conventional constructed wetlands. During the growing season, evapotranspiration through plant leaves reduces the hydraulic load to downstream components. Produces better than secondary quality effluent.	Contact Manufacturer
	Recirculating Media Filters	450 to 36,000+	2001	Designed for use in residential, commercial, or small community applications for treating residential strength wastewater from a septic tank. Treatment occurs below grade as the fluid trickles down through the pore spaces of the media where aerobic organisms feed on the nutrients. Effluent leaves the system through an outlet pipe in the bottom of the filter. Multiple RMFs can be used together when greater capacities are needed. Effluent can be discharged above or below grade. Above grade disposal must meet local health codes or guidelines. Produces better than secondary quality effluent.	Contact Manufacturer
	Fusion	450 to 800	2006	Drop-in wastewater treatment units that use anaerobic and aerobic zones to produce secondary quality effluent. The "drop-in" system is easy to install and maintain. Filter media are never removed or replaced. Key operating features include the constant recirculation of treated wastewater and a twice-daily automatic backwash cycle that returns residual sludge to the head of the system. A quiet, programmable compressor delivers oxygen to aerobic zones, while consuming as little energy as a 80-watt light bulb. The Fusion's unique design enables it to be installed without a pretreatment tank, making it ideal for use on sites where space is limited.	AL, AR, CA, IA, IN, KY, MI, MN, NE, NY, SC, TX, VA, WA, WI

SYSTEM PROFILE

The original installer unpacking the ECOPODs and air blowers using a Kobelco excavator after the precast tanks were set. (Photos courtesy of Infiltrator Water Technologies)

Desert Airstream Trailer Park Gets Permanent Wastewater Solution

Campers near Joshua Tree National Park aren't roughing it, thanks to ECOPOD system

By Tim Dobbins

Airstream camping in comfort is now easier than ever at the Joshua Tree National Park AutoCamp facility, thanks to a new septic system.

AutoCamp is a *glamping* (term for trendy glamorous camping) company with locations spread throughout the U.S. and outside the entrance of Joshua Tree National Park near San Bernardino, California. It's there you will find 55 luxury Airstream campers and a main building housing a craft brewery, restaurant and food commissary, together making a large wastewater output in an area with strict treatment regulations.

Each Airstream camper is equipped with a shower, toilet and mini kitchen producing up to 100 gpd and with so many trailers, the new system needed to handle the daily flows while providing the minimum disruption for a sensitive environment. At the newly constructed camp, the Airstream trailers are parked a minimum of 150 feet from the treatment system.

Taking over

Each Airstream and the main building facility are plumbed separately, but join before entering the first tank of the septic system. When Steve Dinwiddie, owner of Advantage Septic arrived to take over the install, the plumbing between campers was already in place.

"Someone had started the project but couldn't finish it. I'm not sure why, but they were having trouble finding someone who could finish it,"

The Jensen precast concrete tanks are installed, and Delta ECOPODS are lowered in by the first installer.

An ECOPOD E1400 set into a 15,000-gallon precast reactor tank (left), an E600 set in the 5,000-gallon denitrification tank and an E300 ready to be placed into the 3,000-gallon re-aeration tank. Airstream trailers are parked in the background.

Dinwiddie says. "Infiltrator reached out to me because I started doing a lot of the advanced treatment system out here in Riverside County and some of the first ones in Southern California, so I had a lot of experience with it."

Besides the plumbing between campers being hooked up, when Dinwiddie showed up the first time, the leachfield was open, but not completed, and precast concrete tanks were in position with some of the pods set in, but that's it.

"Two leach lines still needed to be finished, all the distribution boxes, all the tanks were in the ground with some of the pods in them, but the covers were not yet installed," he says. "I had to come in to get the rest of the pods in the ground, get everything hooked up, do all the plumbing, install the covers and complete everything else to tie up the project."

System flow

Dinwiddie got to work and when he was done, the wastewater from the Airstreams and main building facility joined into a single 4-inch PVC pipe before entering a 5,000-gallon Jensen precast primary tank. "This is the primary settling tank, it acts like a septic tank," says Chris Strycharz, sales engineer and technical support from Infiltrator. "It has about one day's retention time to settle out the large solids."

Water exits the primary tank through three Polylok filters before entering a 3,000-gallon precast concrete flow equalization tank designed to buffer out the flow over a 24-hour period using a time-dosed duplex pump system with Myers WHR5-21C pumps.

Due to total nitrogen requirements and the volume of wastewater to be treated, the system was designed with a staged denitrifying approach. Pumps move the water through a 2-inch line into the first of three precast tanks, each one housing a Delta ECOPOD unit.

The first is a 15,000-gallon reactor tank lodging an ECOPOD E1400 utilizing a fixed-film process. Water is dispersed into the ECOPOD system through 4-inch PVC tees, positioned in alternating directions across the top the tank to ensure water is evenly distributed into the unit. The unit serves as the BOD and nitrifying reactor. Air is pumped in to promote ample nitrification.

After flowing through the E1400, water exits the precast tank through a 5-inch weir before gravity flowing through 4-inch PVC pipe to a 5,000-gallon denitrification tank housing an ECOPOD E600. In the back of this tank is a Myers WHR5-21C mixing pump to incorporate an added carbon source.

"We mix the carbon source after the BOD and nitrification reactor to allow denitrification to occur," Strycharz says. "Since we are adding a carbon source, we will raise the BOD again, so the next tank is to knock that back down."

After a short pipe connection, the next stage is a 3,000-gallon re-aeration tank housing an ECOPOD E300. After re-aeration, water exits the precast tank via 3-inch discharge weir and travels through 4-inch PVC pipe into the last tank before the drainfield, a 3,000-gallon dosing tank. From this tank, water is moved by duplex demand-dosed Myers ME50S-21 pumps

System Profile

Location:	San Bernardino, California
Facility served:	Joshua Tree AutoCamp
Designer:	Matt Lissak, Kimley-Horn
Installer:	Steve Dinwiddie, Advantage Septic
Type of system:	Jensen precast concrete tanks housing Delta ECOPODs
Site conditions:	Sand
Hydraulic capacity:	5,500 gpd

A finished concrete pad holding two primary Gardner Denver air blowers and a smaller, secondary air blower.

Three Polylok filters located at the exit of the primary settling tank. Holes were cut into the precast concrete lid for future maintenance access.

"It was very difficult to dig individual trenches for leach lines. **If the wind blew hard, it would fill up trenches with sand before the job could be done."**

Steve Dinwiddie

to a 1,300 total lineal foot crushed stone and pipe dispersal field made up of 4-inch perforated Schedule 40 PVC pipe. Drain lines are configured to not exceed 100 lineal feet each, spaced three feet on center and buried at a minimum depth of five feet.

Once plumbing was hooked up and complete, Dinwiddie placed the lids on each precast tank, sealing off the pods for backfilling. A Cat 430 F2 backhoe did the brunt of the work for Dinwiddie and once he was done, the landowner used a skid-steer for backfilling and cleanup.

Each ECOPOD unit requires air supplied through 3-inch airlines by two primary above ground, battery powered, 7.5 hp Gardner Denver air blowers and a 5 hp tertiary blower.

Controlling factors

Governing regulations for San Bernardino demand NSF 245 treatment, requiring 50% reduction for total nitrogen. And because the system is in the Joshua Basin Water District, less than 10 mg/L total nitrogen effluent is required on top of the of the county requirements.

The Delta ECOPOD units from Infiltrator were designed to achieve those levels with minimal maintenance, an important reason why they were chosen for this project.

Soil type played a role in installation as the location was pure sand. "There was a 100-by-100-square-foot hole in the ground and because it was so sandy, it was very difficult to dig individual trenches for leach lines," Dinwiddie says. "If the wind blew hard, it would fill up trenches with sand before the job could be done."

Dinwiddie's 20 plus years of experience was on full display as the size of the system and sandy ground didn't slow him down. "To be honest, the biggest challenge for me was that the project was far away, and they were repaving the highway from the freeway all the way to the job," he says.

The campground is up and running and taking guests. And thanks to the new septic system, visitors can enjoy camping with the sanitary water amenities they're used to at home.

featured products

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Kayla Hanson, P.E., Concrete Sealants
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Dr. Tyler Ley, Ph.D., Oklahoma State University
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Hugh Scott, P.E., Shea Concrete Products
Oct. 27 Noon – 2:00 p.m. ET

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SNAPSHOT

We Could Use Speedier Site Inspections in Virginia

Unfortunately, it can be a game of hurry up and wait when the crew at Garcia Excavation Services installs drainfields

Compiled by Betty Dageforde

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

Valentino Garcia

chief executive officer and co-founder along with my father Greg Garcia, brother Rudy Garcia and wife Jamie Garcia

Business: Garcia Excavation Services, Fredericksburg, Virginia

Age: 37

Services we offer: Septic system installations — mostly new systems. About 5% of our business is repair work.

Years in the industry: I started as a laborer for a septic installation company in 2004. A year later my boss gave me a crew. The company went out of business in 2009 when the recession hit, and that's when we started Garcia Excavation Services.

Association involvement:

I've been a member of the Virginia Onsite Wastewater Recycling Association since 2006 when my former boss signed me up for the orientation classes.

Benefits of belonging to the association:

We learn new things and stay informed about regulation changes. It provides education opportunities and helps to make the industry more professional.

Biggest issue facing your association right now:

It's hard to get members. And it's hard to get the existing members together for meetings and training. Some have to travel an hour or two. Classes were being held in September and October but that's when we're busy trying to get systems in before winter, and for some guys it's hunting season.

Our crew includes:

My father runs heavy equipment and is in charge of part of the materials. My brother is foreman of the crew, runs heavy equipment, and makes sure installations go correctly. My wife handles paperwork and phone calls and runs materials out to the field when we're busy. Luis Bernal is a full-time laborer and runs the grade laser. And Sergio Gonzalez is a part-time laborer.

We have enough equipment for two more crews but haven't been able to hire anyone for the last two years. There's a large restaurant chain here paying $18 to $20 an hour. It would be very hard for us to pay somebody that much when they have no experience. We subcontract some of our work — a company that brings in gravel, a company that brings tanks to us.

Typical day on the job:

Every day I'm in the field operating equipment. In the evenings, I'm doing the planning for the next project, as well as scheduling and pricing.

Valentino Garcia and the "Track Buddy" he designed and built to quickly move around a job site.

The job I'll never forget:

A soil scientist did a soil test for a drainfield. He put holes in the ground every 6 to 8 feet to do the study and everything was fine. We were going to put in six lines, 80 feet long, 3 feet wide. But when we started digging the first line, 5 feet from the line we hit bedrock. So we went to the next trench — same thing. And the rest of the trenches were all the same. It turns out where they poked the holes it was OK but there was bedrock in the middle and the sides. If they moved the auger 6 inches they would have hit the rock. Something like that happens once in a lifetime. The whole drainfield needed to be redesigned for another spot.

continued >>

SNAPSHOT

Jamie Garcia and Caterpillar 312EL.
(Photos courtesy of Garcia Excavation Services)

Rudy and Greg Garcia add filter fabric in 3-foot drainfield trench.

My favorite piece of equipment:

In my free time I work with lathes and milling machines and I invented a little track machine that weighs less than 200 pounds, goes 15 to 20 miles per hour, and fits in a pickup truck — my "Track Buddy." It took me a couple years to design and build it but now I use it all the time. It can go anywhere on the job site, whether it's wet or dry. We work on a lot of three-acre lots. The drainfield is usually in the far back of the lot but we park our trucks on the road, so when you forget something it could take 10 or 20 minutes to walk back to the truck. But now we just get on this machine. I also like our Caterpillar 312EL excavator and our Takeuchi TL10 skid-steer (not too big, not too small, not too heavy) which work together.

Most challenging site I've worked on:

There was a drainfield where the slope was at least 40%. For the trench, we put in 13 inches of gravel with a pipe in the middle, six inches of gravel around the pipe, and two inches over. It was so steep that the only way to do it was with the Takeuchi TL10. We put a berm at the bottom and the machine would just slide down, crash through the berm, and then dump the gravel in the trench. To go up, we had to push the machine with the bucket. You put the bucket down in the ground and at the same time activate the tracks to go back up. Normally we can do a septic system in one day; this one took close to two weeks.

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

Most of our customers are homebuilders so they're very knowledgeable. But one homeowner asked me why we had to put in a DVD box for his drainfield. Maybe he thought it was to record the water passing by or something. I said I'd never heard of a DVD box but I explained what a distribution box was and he was satisfied.

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

After we put in a system, it has to be inspected before we backfill. Inspections are very important but I'd like to see the process be a little easier and quicker. Right now it takes a lot of time. We have to leave everything open waiting for the inspection and if it rains it fills with water. Or sometimes we have to hurry to finish a job because bad weather is coming and we don't want the new homeowner to have any issues. We have to give three days' notice to the inspectors and if you cancel you have to wait even longer.

Best piece of small business advice I've heard:

A mentor who told me a few things: "Give a good product to your customer and the profits will follow," "You want your customers to hire you because you're good; not because you're cheap," and "Never confuse movement with progress."

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

Probably be either a diesel mechanic or a machinist doing metalwork. Working on my lathe machine is my outlet for the stress that owning a business can bring.

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

I think the industry is going in the right direction. There's nothing wrong with the (municipal) sewer and water, but we believe septic systems help more with the environment because whatever you take out of the ground you're putting back in, which is good since it stays in the soil and doesn't go to the sewage plant and then the river. The other thing about this industry is I think there's going to be a shortage of people doing it, which is very unfortunate. ◻

Would you like to see someone in your state or provincial wastewater trade association profiled in Snapshot?
Send your suggestions to Jim Kneiszel at editor@onsiteinstaller.com.

Advanced Treatment Units

By Craig Mandli

ADVANCED TREATMENT UNITS

BioMicrobics RetroFAST

Both the **RetroFAST** and RetroFITT-ee (energy efficient) units from **BioMicrobics** are designed to be a simple upgrade to enhance a conventional septic system or renovate a biologically failed septic system. A unit can be installed inside an existing tank to create an optimized treatment environment using submerged, fixed-film media for microbial growth with an energy efficient aeration system. It constantly sends effluent rich in dissolved oxygen to the drainfield. Where sites and regulations allow, it can be used in new installations. It is designed to deliver high levels of treatment to help ensure clogging layers don't form. **800-753-3278; www.biomicrobics.com**

Eljen Geotextile Sand Filter

The GSF, or **Geotextile Sand Filter**, advanced wastewater treatment and dispersal system from **Eljen** is designed to provide treatment and dispersal in the same footprint, easy installations and minimal maintenance. It is used for both commercial and residential applications. Utilizing a two-stage pretreatment process, the geotextile modules apply filtered septic tank effluent to the soil and increase the long-term acceptance rate. Open-air channels within the module support aerobic bacterial growth on the module's geotextile fabric, surpassing the surface area required for traditional absorption systems. The system is tested and certified by NSF to NSF/ANSI Standard 40. **800-444-1359; www.eljen.com**

MicroSepTec EnviroServer ES

The **MicroSepTec EnviroServer ES** series utilizes five chambers to achieve primary settling, treatment and clarification in one tank. The units use a moving-bed biological reactor made specifically for the residential market. The first compartment of the system is the primary clarifier for settling sludge and solids. The second section houses the first of two aeration chambers and contains biomedia providing surface area to promote a healthy population of microorganisms. The third compartment is used for further aeration to amplify the growth of nitrifying bacteria and the process of nitrification. The fourth chamber is the final clarifier where suspended solids settle out. Wastewater is then recirculated back to the primary clarifier in the first compartment, which contains enough carbon to promote denitrification removing high levels of nitrate. Clarified water then moves through an effluent filter before entering the fifth compartment, an effluent chamber for storage. **877-473-7842; www.microseptec.com**

Orenco Systems AdvanTex AX-RT Series

The **AdvanTex AX-RT** Series of advanced wastewater treatment systems from **Orenco Systems** is designed for system repair and rehabilitation. All interior components are installed, plumbed and adjusted at the factory. Units can be shallowly buried for use between a functional, watertight septic tank and a functioning drainfield. The design includes recirculation, treatment and discharge in a single unit to simplify installation and eliminate the need for additional tanks, basins, risers and lids. The system can be maintained with an annual service call. Filters and textile media are accessible and cleanable, and control panels are touch-safe. No blower is needed for the passively vented system. An optional UV disinfection unit is available. **800-348-9843; www.orenco.com**

Zoeller Pump Company Clarus Fusion

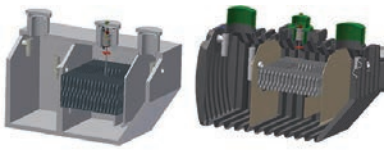
Clarus Fusion systems from **Zoeller Pump Company** are drop-in wastewater treatment units designed for decentralized applications where effluent quality must meet or exceed secondary treatment standards. They are designed for residential, commercial and small community applications and are available in 450 to 4,000 gpd treatment capacities. All models up to 800 gpd are NSF/ANSI Standard 40 certified to produce effluent quality of 9 mg/L $CBOD_5$ and 9 mg/L TSS. The design enables installation without a pretreatment tank, making it suitable for sites with limited space. Effluent disposal options include conventional trenches, dosed systems, drip irrigation or disinfection with direct discharge. **800-928-7867; www.zoellerpumps.com**

NITROGEN REDUCTION SYSTEMS

Eliminite Commercial C-Series

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

Jet Inc. J-1500CF Series



The **J-1500CF Series** nutrient-reducing BAT media plant from **Jet Inc.** offers variable capacity in an NSF-245-tested treatment system. It provides complete effluent treatment from 500 to 1,500 gpd. The 500 and 800 gpd PLT Series tanks are the lightweight, rotational molded alternative to the concrete J-1500CF Series. The seamless polyethylene tanks are easy to transport and install in difficult site conditions. The system uses a 700++ aerator, effluent filter and the Jet 197 control panel, which cycles the aerator to reduce nitrogen by over 60%. **800-321-6960; www.jetincorp.com**

RECIRCULATING FILTERS

Anua BioCoir

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

SeptiTech STAAR filter systems

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

UV DISINFECTION

Polylok PL-UV1 UV Disinfection Unit

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

WATER/WASTEWATER REUSE SYSTEMS

E-Z Treat

The **E-Z Treat** recirculating synthetic media filter complements multiple applications of flows from 100 to 100,000 gpd. It is engineered for a variety of wastewater solutions, including single and multifamily residences, RV parks, campgrounds, schools, churches, restaurants and convenience stores. It was developed by direction of the U.S. EPA's Onsite Wastewater Treatment Systems Technology manual for advanced secondary treatment. This technology is NSF 40/245/350-Reuse tested and approved. Nitrogen reduction is greater than 65%. It is a simple, self-contained system that includes one or more units, a recirculation pump, control panel, floats and a bypass valve. **703-753-4770; www.eztreat.net**

Norweco Singulair Green R3

The **Singulair Green R3** water reuse system from **Norweco** is designed to reduce water consumption, reuses treated effluent and recycles water to conserve and recharge water resources. It provides a solution to chronic water shortages and reduces energy costs associated with water and wastewater treatment. The system quietly, efficiently and automatically treats all incoming wastewater to the highest level for restricted indoor and unrestricted outdoor use, according to the maker. The system exceeds the effluent requirements of NSF/ANSI Standards 40, 245 and 350. It qualifies for green building credits under both the LEED rating system and the NAHB ICC 700 National Green Building Standard. **800-667-9326; www.norweco.com**

Advanced Treatment Units

By Craig Mandli

Package MBBR system treats high-strength meat packing plant wastewater

Problem: Experiencing interruptions in food deliveries due to the COVID-19 pandemic, the Cherokee Nation recognized the importance of having their own meat supply. Plans for a meat processing facility were developed on tribal land west of Tahlequah, Oklahoma. With no access to a municipal sewer system at the site, the tribe required a wastewater system to handle variable flows and high organic loading, while being simple to operate and maintain by facility personnel.

Solution: The **Earthtek Environmental Amber** MBBR system was selected due to its ability to automatically respond to organic load fluctuations, its minimal operation and maintenance requirements, and the cost-effectiveness of the treatment process for high-strength wastewater. The system is installed in durable buried fiberglass tanks, which are lightweight, watertight and corrosion resistant. The system contains thousands of polyethylene media mixing within aeration tanks, which provide a large surface area for bacteria to attach and grow. The bacteria consume organic material and self-regulate the biofilm thickness, automatically sloughing excess biofilm and adjusting to variable flows and loading. The system includes a pre-existing 10,000-gallon primary tank to settle solids and provide anaerobic digestion of waste sludge; two aerobic MBBR tanks to reduce BOD; one settling tank to capture sloughed solids; chlorine tablet disinfection; and a spray irrigation field for disposal of the treated effluent.

Result: The system has performed as anticipated. **800-972-9940; www.packageplants.com**

ATU meets needs for 100-lot development

Problem: A 100-lot subdivision in Clermont, Florida, near the Clermont Chain of Lakes, was originally platted with lots sized for connection to a municipal sewer system, but sewer infrastructure was never completed. Installer Chris Bryan of Advanced Septic Services was charged with finding an onsite solution that would serve each home. The total lot size was 7,800 square feet, with a sandy soil texture and only 72 inches to the water table from existing grade. The systems required a footprint of less than 500 square feet for the treatment tank and field.

Solution: Bryan specified **Fuji Clean Model CE5** systems for each home. The systems feature a design capacity of 500 gpd, and have proven international treatment results of BOD <15 mg/L and TSS <15 mg/L. They offer one-tank treatment with tiny footprint and low profile of 85 by 44 by 62 inches. Their quiet blower (<50 dB) requires less than 1.2 kWh/day, while the lightweight 397-pound tank is easy to maneuver into location. One 3/4-inch airline hookup minimizes excavation requirements. Systems are available with a 525- or 1,050-gallon dosing tank with pump, and a 250-linear-foot drip disposal field is installed no more than 8 to 10 inches deep.

Result: The systems were installed and continue to perform as expected. **207-406-2927; www.fujicleanusa.com**

Package treatment plant enables expansion and reduces maintenance at RV park

Problem: Yogi Bear's Jellystone Park in Waller, Texas, is a full-service campground and recreation center featuring cabins, tent sites, RV camping, swimming pools, a lazy river and two food service venues. The park's existing sewage treatment system had been expanded many times and was again at capacity, restricting park service expansion and requiring costly and time-consuming maintenance. The design engineer was tasked with designing a new system that could handle the wastewater flow of 30,000 gpd and meet Texas Commission of Environmental Quality standards.

Solution: A **Delta Treatment Systems Package Treatment Plant** was selected to process wastewater via an extended aeration and oxidation process that purifies sewage using naturally occurring bacteria to destroy the organic compounds. Continued mixing with air feeds the biological organisms, which consume the volatile materials and convert them into water and inert solids. The result is a clear and odor-free effluent that meets TCEQ permit requirements. The custom package plant is installed on an engineered, reinforced concrete structural slab. The plant has dual aeration basins, sludge holding tanks, blowers and pumps, and a single 10-foot-diameter mechanical clarifier with skimmers and a clarifier bridge. A separate pump tank was incorporated into the design.

Result: The custom-designed plant was built at the factory and shipped to the project site as a self-contained unit and required little assembly. It continues to perform as expected. **800-221-4436; www.infiltratorwater.com**

Pretreatment system used for high FOG wastewater

Problem: The Cottage Hotel is a historic tavern and restaurant in Mendon, New York. The one-third-acre parcel presents major challenges for a septic system, as space at the site is mostly limited to the footprint of the buildings and parking. Wastewater is treated and then discharged into a nearby stream. Pretreatment had historically been accomplished through an aerobic treatment unit with polishing through a single-pass sand filter with SPDES-permitted surface discharge. Although the ATU and sand filter are good treatment technologies, at this particular site, the fats, oils and greases generated from the kitchen waste were too much for the system to handle, causing the sand filter to clog routinely. Regulatory authorities mandated the failing system be upgraded to be better suited for handling the high strength of commercial wastewater.

Solution: The owner hired Onsite Engineering to design a commercial septic system to handle the high strength restaurant wastewater — and treat it to the high level needed for a permitted surface water discharge. The redesigned system uses the **White Knight Microbial Inoculator Generator** from **Knight Treatment Systems**. The system inoculates and pretreats the wastewater with select bacteria that aggressively digest the FOG and other organic constituents prior to passing through the rebuilt single pass sand filter.

Result: The system has been working well since its 2017 installation. **800-560-2454; www.knighttreatment.com**

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

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

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Recycling Association;
www.dowra.org

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www.fowaonsite.com;321-363-1590

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Onsite Wastewater
Professionals of Illinois;
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Professionals Association;
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Iowa Onsite Waste Water Association;
www.iowwa.com; 515-225-1051

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

KENTUCKY
Kentucky Onsite Wastewater Association;
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www.yankeeonsite.org; 781-939-5710

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

Granite State Onsite Wastewater Association;
www.gsdia.org; 603-228-1231

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

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

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

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Ohio Onsite Wastewater Association;
www.ohioonsite.org; 740-828-3000

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

PENNSYLVANIA
Pennsylvania Association of
Sewage Enforcement Officers;
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www.psma.net; 717-763-7762

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

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

VIRGINIA
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WASHINGTON
Washington On-SiteSewage Association;
www.wossa.org; 253-770-6594

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

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

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

National Onsite Wastewater
Recycling Association;
www.nowra.org; 978-496-1800

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

CANADA

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

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

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

MANITOBA
Manitoba Onsite Wastewater Management Association; www.mowma.org; 877-489-7471
Onsite Wastewater Systems Installers of Manitoba, Inc.; www.owsim.com; 204-771-0455

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

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

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

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

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

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

If you would like your wastewater trade association added to this list, send contact information to editor@onsiteinstaller.com

INDUSTRY NEWS

ADS acquires Cultec

Advanced Drainage Systems announced it has acquired Cultec, a family-owned plastic stormwater and septic chamber company headquartered in Brookfield, Connecticut. Cultec's worldwide presence includes chamber installations throughout the United States, Canada, Europe, South America and the Caribbean.

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MARKETPLACE ADVERTISING

Infiltrator Plant Selection Tool web app

Infiltrator Water Technologies launched a new web application to simplify the design process for decentralized wastewater treatment plants. The Wastewater Plant Selection Tool translates user input of project parameters like flow rate, influent parameters, and effluent requirements. Then, the tool instantly generates preliminary design documents including system drawings of a solution to best match the project needs. This new design tool is available for anyone to use on the Infiltrator website. **800-221-4436; www.infiltratorwater.com**

PRODUCT SPOTLIGHT

Effluent filter designed to be cleaned in place

By Tim Dobbins

Watercore built its C4C effluent filters to be efficient at solids separation, while focusing on convenience for distributors, installers, service techs and homeowners.

"We set out to create a better way to service effluent filters, incentivizing the homeowner to leave the filter in place, thus minimizing callbacks to the installer as well as making the service tech's job much more efficient," says Mike Hornback, sales representative for Watercore.

The result is the C4C series, a filter that can be cleaned without removing it from its housing, eliminating mess and any contact with effluent. The filter utilizes an internal wheel design featuring multiple blades that protrude through each vertical filtering slot. The wheel is attached to a hollow tube that extends out the top of the filter and has a handle attached. Simply moving the handle up and down moves the blades through the slots, cleaning the filter.

"This action not only clears the filtering slots but clears the solids from inside the filtering cartridge as well," Hornback says.

For an additional cleaning method, the C4C series has a feature that allows a garden hose to be attached directly to the handle. This allows water to flow through an internal perforated tube and spray through the filtering slot to further rinse the filter if needed.

C4C filters can handle 800 gpd with a 1/16-inch filtration. The outlet port on the C4C tee baffle accepts 3- and 4-inch schedule 40 PVC and 4-inch SDR with no adapters needed. Filters can be purchased as a complete unit or components can be bought separately.

The filters are NSF certified and filter cartridges are interchangeable, working with most existing tee baffles. "This allows anyone to take advantage of the design without any extra expense to retrofit their existing system," Hornback says. "Just pull out the existing cartridge and drop the C4C in its place."

The team at Watercore prototyped and field tested the design for roughly 18 months to ensure it would perform in all situations, including extreme conditions and to confirm installing and cleaning the filter was efficient and easy.

"It's so user friendly that even the homeowner can easily do it themselves in emergency situations," Hornback says. **812-493-4550; www.watercorefilter.com**

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