

# Getting It Right

A failed system, an adventurous homeowner and new technology create the opportunity for a better onsite solution in Illinois

By David Steinkraus

The combination of a sensitive site and a client sensitive to the environmental effects of his wastewater system gave David Zeiter and his company a chance to stretch with a new technology. There was one other factor: The household system had failed.

“Unfortunately the house was only three years old when the septic system failed,” says Zeiter, who is president of Zeiter’s Septics Unlimited in Morris, Ill. “I think, with the soils there, the system was not sized properly from the outset.”

As soon as he saw the site and the old, flooded quarry 200 feet from the house, he knew what to expect. “We found bedrock at 3 feet all over. In half a dozen holes in an area 200 by 1,000 feet, we hit bedrock no matter where we dug. They happened to put the old system in a place where the bedrock was a bit farther down.”

The first system consisted of a 1,500-gallon Infiltrator tank and 210 Infiltrator EQ

A 4-inch SaniTEE was added to the home’s existing septic tank to improve the filtration of effluent flowing to the tank holding the BioBarrier.



With excavation complete, the crew awaits the new tank to hold the BioBarrier system. At the center of the photo is the riser lid for the home’s existing septic tank that was repurposed for settling and filtration. (Photos courtesy of David Zeiter)

## SYSTEM PROFILE

|                                |   |
|--------------------------------|---|
| <b>Location:</b>               | Kankakee, Ill.  |
| <b>Facility served:</b>        | Single-family residence   |
| <b>Designer and Installer:</b> | David Zeiter, Zeiter Septics Unlimited, Morris, Ill.  |
| <b>Site conditions:</b>        | Soils of silt loam, clay loam, and silty and sandy clay loam, draining moderate to well, but with bedrock contact at 30 to 39 inches            |
| <b>Type of system:</b>         | Domestic wastewater recycling using aerobic aeration and a BioBarrier membrane filter from Bio-Microbics Inc. with discharge to surface waters. |
| <b>Hydraulic capacity:</b>     | 500 gpd   |

chambers. The soils report found no penetration below 30 to 45 inches, and one core found a seasonal high water table at 36 inches. When the system failed, the symptoms were classic: Water from the last two laterals in the installation broke through the surface of the ground.

Test holes were required by the local health department, and the results changed the outlook for the property near Kankakee, Ill. The conventional solution in shallow bedrock would have been a raised filter bed, but that



was too expensive for the homeowner. At that time, Zeiter went to a session about the BioBarrier made by a division of Bio-Microbics. The BioBarrier unit uses a blower to sustain aerobic bacteria, but its defining feature is a membrane filter with pore sizes between 0.3 and 1.3 microns. This is large enough to pass water molecules but too small for bacteria. Water coming out of the unit is clean enough for secondary uses such as yard and garden irrigation, flushing toilets, even for washing clothes, Zeiter says.

This appealed to the property owner Ben Haigh. Various pieces of mining equipment and old military vehicles have been sunk in the quarry, and divers from a wide area come for sport or certification. Haigh had installed his own geothermal heat system and wanted to do his part to keep the quarry's waters clean. He chose a BioBarrier system, and his project became the first installation of the unit in Illinois.

## EQUIPMENT

Because the failed system was recent, Zeiter used the existing septic tank for primary treatment and settling. But Zeiter removed the original baffle and installed a 4-inch SaniTEE from Bio-Microbics to provide filtration of effluent.

From the septic tank, wastewater flows by gravity into the second treatment tank, a 1,500-gallon model from Wieser Concrete of Maiden Rock, Wis. Zeiter picked the company because it molds tanks to specification and delivers quickly. In this case he specified a side hole to fit the alignment of the existing septic tank. He also

**"We found bedrock at 3 feet all over. In half a dozen holes in an area 200 by 1,000 feet, we hit bedrock no matter where we dug."**

**David Zeiter**

specified Infiltrator risers, one 24 inches and the other 30 inches to allow for installation of the BioBarrier unit. Stainless steel cables connect to the side of the BioBarrier so its 100-pound full weight can be winched out of the tank for maintenance.

A 1/5 hp pump from Goulds pulls water through the BioBarrier membrane and discharges through a 3/8-inch hose. This is stepped up to a



The BioBarrier unit in place inside the new concrete tank.





As installation progresses, the new 1,500-gallon Wieser Concrete Products tank is put in place. It holds the BioBarrier unit. The green riser lid at left marks the 1,250-gallon septic tank that Dave Zeiter uses for effluent settling and filtration. The pipe leading to the rear of the photo takes recycled water from the BioBarrier to a drainline leading from the home's downspouts to a nearby flooded quarry.

1 1/2 inch hose before it leaves the tank, and the flow joins a 6-inch pipe from the home's downspouts. This water flows 200 feet to the quarry.

Zeiter's workers did their excavating with a Komatsu PC 128 and did backfilling with a Bobcat T250.

A panel made by Maveric Automation for Bio-Microbics controls the system.

## INSTALLING WITH ZERO PITCH

The BioBarrier tank sits on 6 inches of sand laid right on top of bedrock. When he looked at the tank height they were forced to accept, Zeiter realized he had zero pitch to the drain line that leads to the quarry. Then Kurt Bihler, the local BioBarrier representative from Bihler Tech Inc., stopped by.

"He is very knowledgeable when it comes to pumps and total dynamic head pressure, and he says, 'Let's shoot some grades: where we come out of the tank with the pipe and the line at the gutter tile.' So we did, and he says that little pump would do the job. Kurt says, 'Dave, trust me. This is what I do.'"

It worked. From the top of the tank the discharge line went down 3 feet to avoid frost, then back up 3 feet into an inspection port, and then into the 6-inch drainline. When they started it up, the little pump took a couple of

minutes to push the water that far, but it got there. "So we were able to eliminate a lift station, use the existing pump, and save the owner about \$1,000," Zeiter says.

No restoration was required. Extra dirt went to a motocross track for Haigh's son.

Zeiter achieved a faster startup time and better efficiency because of the way he seeded the system. BioMicrobics recommends two gallons of activated sludge for startup. Zeiter hauled in about 800 gallons of aerated liquor from a local municipality, which was happy to give it away for free. When initially started with activated sludge, the BioBarrier requires six to eight hours to pull the designed flow of water through the membrane because solids clog the membrane. As aerobic digestion improves, it reduces the

**"Unfortunately the house was only three years old when the septic system failed. I think, with the soils there, the system was not sized properly from the outset."**

David Zeiter

quantity of solids and the time to move water decreases, Zeiter says. His installation treated the average daily usage of 250 gallons in about 2 1/2 hours from the beginning.

Another useful feature, Zeiter says, is a data port that allows him to download operating information onto a USB drive. It comes out of the control panel in a basic format (comma-separated values, a .csv file) that can be easily imported into Excel or other programs for analysis. Results have been so good that Zeiter's technicians may not have to do any cleaning of the membrane during the initial two-year service commitment.

## STATE OF UNCERTAINTY

Like other states, Illinois is trying to eliminate surface discharges. That made Kankakee County staff ask plenty of questions when Zeiter came in with a new technology discharging to a surface body of water.

There was no room for this in the current code,

and one of the county staff questioned whether chlorination would be required.

Ultimately the question went all the way to the state capitol in Springfield and the state's environmental health director. He wrote a letter granting a variance for BioBarrier installations, Zeiter says. Until Illinois rewrites its sanitary code, the letter will allow him and other contractors to do additional installations.

The solution came along at just the right time for this project, and Zeiter connected with a homeowner who was not interested in the fast and cheap. "He was looking at the long-term solution and embracing a new technology," Zeiter says. □

## MORE INFO:

**Bio-Microbics, Inc.**  
800/753-3278  
www.biomicrobics.com  
(See ad page 11)

**Goulds Water Technology  
- a Xylem Brand**  
866/325-4210  
www.gouldswatertechnology.com

**Infiltrator Systems, Inc.**  
800/221-4436  
www.infiltratorsystems.com  
(See ad page 3)

**Wieser Concrete Products, Inc.**  
800/325-8456  
www.wieserconcrete.com  
(See ad page 25)