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SHOW ISSUE



Onsite Choices for Legal Marijuana Growing Facilities

Zeiter Septics Unlimited is called on late in the development of two Illinois indoor growing operations and installs membrane bioreactors to handle wastewater

By David Steinkraus

«The layout of the MBR system at the marijuana processing plant near Hillcrest, Illinois, was much more straightforward than the Dwight operation. In the foreground, the Arc chambers of the drainfield are just visible. The combination settling tank and MBR tank, and 1,000-gallon pump tank, are covered by Infiltrator Water Technologies risers and lids. (Photos courtesy Dave Zeiter)

»Technician Jim Koltunchik applies ConSeal butyl sealant on the Wieser tank for the MBR at the Dwight, Illinois, marijuana processing operation.



The growing number of states allowing marijuana for recreational or medicinal use opens another business area for wastewater professionals, as Zeiter's Septics Unlimited learned recently. Zeiter, based in Morris, Illinois, was hired to complete the wastewater systems at two new marijuana growing and processing operations, each about 80 miles from Chicago.

One facility is located near Dwight, Illinois, southwest of Chicago, the other near Hillcrest, Illinois, due west of the city. Both facilities were well along when Zeiter was brought in to replace a different contractor. It became his job to salvage the project, which had somehow been started without the proper permits and posed other obstacles.

"The soil was terrible. It was clay, and it was very tight, wet clay," Zeiter says. In addition, the site had been under heavy vehicle traffic that compacted the soil, and aggregate and spoils had been stockpiled on the proposed drainfield site of 30 by 30 feet. This didn't help the infiltration tests.

During his initial evaluation, Zeiter went in with a Caterpillar bulldozer, ripped up the existing clay soil on the drainfield site, raised a section 6 inches, mixed it with the best topsoil he could find on the land, and tested the infiltration. Even with this help, the per-square-foot loading rate was 0.27 gpd, which implied an absorption field with more than 500 linear feet of laterals. Given all those constraints and the owners' desire for an advanced, environmentally friendly wastewater solution, membrane bioreactors were the logical choice.



Two systems, one solution

Both processing facilities use BioBarrier MBRs from Bio-Microbics.

In Dwight, effluent from the processing building runs by gravity about 45 feet through 6-inch SDR 26 pipe to a 771-gallon tank from Grove Concrete. Another 4-inch schedule 40 pipe for the floor drains brings in more wastewater from the grow building that is also about 45 feet away.

The 771-gallon tank functions as a lift station because the wastewater pipes had been buried by the previous contractor at a depth of about 6 feet. Inside the tank, two 2 hp Liberty Omnivore grinder pumps push waste through a pair of 2-inch schedule 40 discharge lines that run to a 2,500-gallon tank from Grove. Of the total volume, 1,000 gallons are used as a trash and settling tank with a pair of 4-inch SaniTEE filters (also Bio-Microbics). The other 1,500-gallon section houses the two 0.5 MBRs. A 2-inch pipe takes treated water by gravity into a 12-inch-diameter stormwater tile that surrounds the property and flows into a detention pond about 1,000 feet from the tanks. An NPDES permit was required because the storm tile eventually discharges into a detention pond.

At the Hillcrest plant, wastewater flows about 43 feet from the processing building into a 2,500-gallon tank from Wieser Concrete. A trash and settling tank takes up 1,000 gallons of that volume, and the other 1,500-gallon space houses the MBR. A pair of 4-inch SaniTEE filters separates the two sections.

From the MBR, water flows to another Wieser tank. This one is 1,000 gallons and holds a pair of Sta-Rite 1/2 hp turbine pumps (Pentair). They dose

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Dave Zeiter

the drainfield through about 30 feet of 2-inch schedule 40 pipe. The field is comprised of two 80-foot sections of ADS Arc 24 chambers on top of the soil.

At both Dwight and Hillcrest, the systems are controlled by panels from Ohio Electric that accommodate the Cell682 Sensaphone remote dialers to alert technicians if there is a problem. Dosing is on demand with about 100 gallons per dose.

Designed for tomorrow

The system in Dwight is sized and designed for the possible addition of a kitchen and bakery that would produce products containing the marijuana oil produced by the operation. "We don't know what waste products the kitchen will bring into play in the system," Zeiter says.

That was far from the only worry about the small indoor agricultural operation. "We were also very concerned about the chemicals in irrigation water coming off the plants," Zeiter says. "But in my years of (onsite work),



▲ At the Hillcrest site, effluent from the Bio-Microbics MBR flows into two 80-foot sections of ADS Arc 24 chambers.

▼ Cory Wilson performs a double ring infiltrrometer test after installation at the Hillcrest site.



System Profile

Location: Dwight and Hillcrest, Illinois
Facility served: PharmaCannis
Designer: Zeiter's Septics Unlimited
Installer: Zeiter's Septics Unlimited
Type of system: BioBarrier MBR
Site conditions: Clay soil, dense and wet
Hydraulic capacity: 450 gpd



these owners were among the best in their concern for the system. We told them, 'This is a water recycling system; it's not a sewer; it's not a typical onsite wastewater treatment plant.' They asked us lots of questions and wanted to know what other people are using in their BioBarrier systems to prevent problems." That included a discussion of cleaning products that would not harm the biomass inside the MBR. Wastewater from the plant-growing operation does not enter the MBR treatment chain. It is treated as agricultural runoff and is directed elsewhere.



Call the expert first

By the time Zeiter was brought in to replace the first contractor, both processing plants were close to 80 percent complete, and the client was committed to beginning production by a certain date. As the design progressed, Zeiter discussed the option for reusing treated water for irrigating the plants. The local health departments were open to the idea, and approval looked likely, but the owner's plumbing plans had not originally called for a full water reuse system at the Dwight complex. This would have required the use of marked piping to separate non-potable and potable water. In the end the production deadline left no time to change the building's plumbing.

Wastewater pipes coming out of buildings at Dwight were buried deeply because the previous contractor was accustomed to municipal sewer systems. And the project was complicated by the presence of other supply lines crossing in the same space that wastewater pipes used.

"You're talking a 2-inch gas main, an 8-inch water main reduced to 4 inches, and power was running through there," Zeiter says. There was also a pipe taking water from a well to four 25,000-gallon tanks supplying the fire-suppression system and buried under the parking lot. "And everything was running on angles. We had a lot of hand digging."

Zeiter ordered the grinder pump tank with a thick, rebar-reinforced lid to support more than 5 feet of earth. The depth of the wastewater lines dictated part of that; the presence of a nearby service road also played a part in his decision.

Look to the future

The Hillcrest installation was straightforward. "At Hillcrest they probably could have done a raised filter bed instead of the MBR, but we felt this would be a better long-term fit." Although a raised sand filter bed was possible, the MBR will allow the company to capture water for reuse if the owners ever wish to do so, Zeiter says. Also, at least on paper, the absorption field will never need service because water from the MBR is so clean.

The Dwight processing plant is only about 2 miles from town, so municipal sewer there could be a possibility in the future. In either case the only real maintenance is changing the membrane filters at eight or 10 years. And should the owner ever want to complete the water reuse cycle, the BioBarriers will allow that.

Even though deadlines were tight, Zeiter's Septics came to the rescue and helped a fledgling business meet its deadlines and prepare for a future of growth.

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