

Sand Savior

A microbial inoculator generator successfully remediates a severe failure in an apartment building's sand filter treatment system

By **Scottie Dayton**

The sand filter for a 36-unit apartment complex in upscale Hyde Park, N.Y., had failed. Responding to initial complaints, Richard Robbins, head sanitarian for the Dutchess County Health Department, found the most catastrophically clogged system he had ever seen.

Ponding was so atrocious that he mandated stopgap measures and that the system be replaced within 90 days. Jones Septic in Hyde Park capped the sand filter with 12 to 18 inches of coarse fill and gravel and installed a curtain drain around the perimeter. Sewage bubbling out was directed to the drain, passed through a chlorination chamber, and discharged into a stream.

During the interim, Robbins inspected a strip mall's drainfield that had been remediated by a White Knight Microbial Inoculator Generator. His investigative dig revealed clean

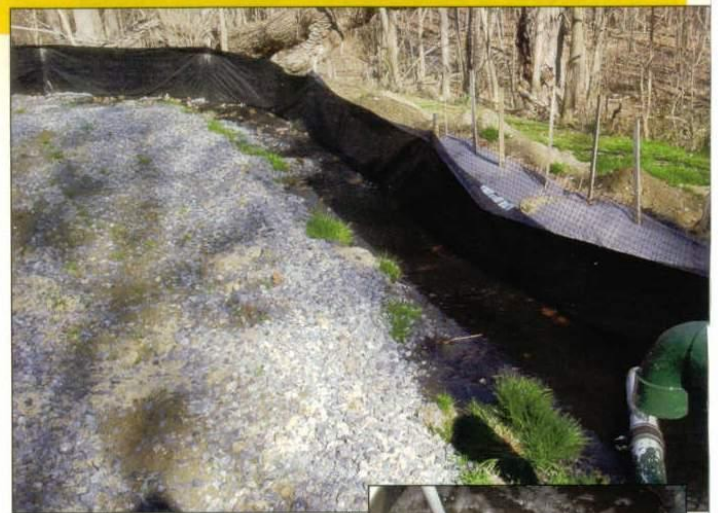
effluent with no trace of fats, oils or grease, even though the field served a deli and two restaurants.

Impressed, Robbins returned to the apartment owner, recommended the reclamation process, and said that he wouldn't force him to replace the sand filter if the technology worked. He monitored the rehabilitated sand filter for three months, then gave it a clean bill of health.

Site conditions

Bob Rice of Hudson Valley White Knight Systems Inc. in Staatsburg, N.Y., and Mark Noga, vice president of market development for Knight Treatment Systems in Oswego, N.Y., visited the time-dosed sand filter, which had been installed in the early 1990s.

Three 4,000-gallon concrete septic tanks served three 12-unit apartment buildings. The 110- by 50-foot sand filter, designed for 8,000 gpd, was across



Above, sand filter effluent surfacing with diversion drain. At right, the White Knight treatment system in operation.



the street behind an intermediary property. The men dug two inspection ports and found significant ponding caused by an extensive organic clog mat. "The pump station had fallen into such disrepair that hydraulic pressure was gravity-feeding the bed," Rice says.

Although the tanks weren't leaking, they were under the parking lot and the manhole covers had settled, allowing collection and stormwater infiltration. Soils were poor and shallow. "We were diligent in our investigation to make sure that the problem was not due to mechanical or hydraulic issues," Noga says. "We're not the magic bullet for every system, but this one definitely had organic materials clogging the sand filter."

System components

- Three stand-alone commercial White Knight Microbial Inoculator Generators with auxiliary diffusers from Knight Treatment Systems Inc.
- Three A100-12 effluent filters with 1/16-inch screens from Zabel Environmental Technology, Crestwood, Ky.
- Three 1/6-hp lineal diaphragm air pumps from Reitschle Thomas, Louisville, Ky.
- Three 1/2-inch I.D. Schedule 40 PVC air supply lines.

System Profile

Location:	Hyde Park, N.Y.
Facility served:	Apartment complex with 36 units
Installer:	Hudson Valley White Knight Systems Inc., Staatsburg, N.Y.
Site conditions:	Biologically clogged sand filter with excessive ponding
Type of system:	White Knight Microbial Inoculator Generators with auxiliary diffusers, Knight Treatment Systems Inc., Oswego, N.Y.
Hydraulic capacity:	8,000 gpd



Top photo, an investigative dig into the old sand filter. Above, a typical water sample from a White Knight treatment tank sample. At left, the sand filter following remediation.

System operation

The tank's normal liquid level is above the top of the microbial unit. An air line introduces a fine bubble mix through the bottom of the diffuser to oxygenate the system. The air also flows up past an initial charge of IOS-500 aerobic and facultative bacteria, activating it.

As the microorganisms reproduce on the system's single-media treatment column, they eat the organic materials in the tank, are discharged to the filter bed, and continue their biological remediation there.

Installation

Rice and one employee installed the units in two-and-a-half days without disrupting service. Almost 100 percent of the installation was accomplished from the surface without tank entry. The tanks were pumped, but not power-washed, as the residuals fed the microorganisms while the tanks refilled.

The men, working at midday when the flow rate was lowest, placed the remediation units and auxiliary diffusers on either side of the inlet for greatest oxygen dispersal. "Judging from the amount of sludge and scum in the tanks, it looked as if they hadn't been serviced in more than a year," Rice says. "That's way too long with their daily flow rate."

To introduce inoculant-laden effluent into the clogged area as quickly as possible, the distribution lines were jetted. "We cleaned them two additional times over the next four months because the sludge kept settling," Rice says.

Each unit required a pump-failure alarm and a PVC air-supply line from the pump. The team hung the pipe on the underside of a parking garage and buried it beneath the parking lot. "We waited for the tanks to refill, then returned and placed two bags of inoculating matrix into each unit," says Rice. "Even though we saw static liquid in

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— Bob Rice

the observation ports, the curtain drain stopped discharging around two months after the units came online, so we knew the sand filter was gradually accepting wastewater at a greater pace."

Robbins had given Rice three months for the system to rejuvenate itself. One week before the grace period expired, the static liquid levels in the inspection ports started dropping. "We knew that the effluent

had reached equilibrium because it looked like pale lemonade and had visible colonies of thriving microorganisms," Rice says. "The tanks didn't have any solids in them and smelled faintly like flowers, which we attributed to laundry products."

The ports have remained dry. Laboratory analysis of the liquid leaving the sand filter showed BOD at less than four 4 mg/l and TSS at 10 mg/l.

As the parking lot was being repaved, Rice installed risers on the manholes. The asphalt was then mounded around the risers to funnel water away. The last phase was excavating the coarse fill and gravel cap, covering the sand filter with topsoil, and seeding and mulching it.

Biological remediation saved the property owner some \$80,000. He chose not to immediately replace the time-dosing mechanism. ■