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6-1996

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Repository Citation

Thom, William O. and Keefe, Pat, "Maintaining Conventional Septic Systems" (1996). *Agriculture and Natural Resources Publications*. 12.

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Maintaining Conventional Septic Systems

W. O. Thom and Pat Keefe

Introduction

Septic systems are used in Kentucky where municipal sewage treatment is not available. They are an effective, long-standing method of collecting, treating, and disposing of homeowner wastewater, provided they are properly sited, installed, and maintained. However, a well-sited, properly sized and installed system will fail if not properly maintained. A failed septic system creates problems such as noxious odors, lowered property values, surface water contamination, and groundwater pollution and may be a health hazard. Repair and replacement costs are considerable.

Additional information on assessing septic system performance and reducing the potential risk of groundwater contamination is available from a KY-A-Syst publication: Household Wastewater Treatment (IP-44). This self-evaluation can be used by the homeowner to determine performance and as additional information for keeping the system maintained.

Conventional System

Several components can be assembled to create an effective septic system. But the most common system used by Kentucky homeowners is called a conventional system and consists of a septic tank and drainfield. The septic tank is a reinforced, watertight, concrete box buried in the ground near the house to provide primary treatment of the wastewater. Wastewater flows from the kitchen, bathrooms, and laundry into the tank. The solids settle from the water and fall to the bottom forming a layer of sludge. The grease and lighter materials form a scum layer on top of the water. The clarified wastewater in the middle enters the drainfield through a buried, watertight pipe.

The drainfield consists of two to six trenches excavated into the soil. Each trench contains a four-inch perforated pipe covered with about one foot of rock which is then covered with soil to the top of the trench. The drainfield delivers wastewater to the gravel and soil where (1) bacteria and viruses are filtered out or adsorbed and held by the soil until they die; and (2) nutrients in the water are converted to other forms (gaseous or solids), or some are adsorbed by the soil.

General Maintenance Tips

Sound operation and maintenance practices include water conservation, keeping harmful substances out of the system, and having the system inspected and pumped on a regular basis. Good operation and maintenance practices start with everyone in the household knowing what damages the septic system. Having a diagram of the complete system indicating distances and locations of the tank and drainfield helps avoid practices that can harm the drainfield and assists in regular maintenance activities.

A generic groundwater protection plan is needed for all septic systems in Kentucky. Copies of the plan to be completed by each homeowner can be obtained from county Extension offices, local libraries, and most local health departments. Questions related to these plans should be addressed to the Kentucky Division of Water.

Maintaining the Septic Tank

Pumping the septic tank regularly is probably the single most important practice that can protect the system. The solids that settle out in the tank should be removed every three to six years depending on water usage and the amount of inorganic materials entering the system. A guide to follow with a 1,000-gal tank is to pump every three years for a household of four or more people and pump every six years for one with two people (increase times by one-half for 1,500-gal tanks).

You also can determine when pumping is needed by opening the top of the tank and making some measurements and observations. **(CAUTION: NEVER INSPECT A TANK ALONE, AND NEVER GO DOWN INTO A TANK. Toxic gases are produced by the natural treatment processes in the tank and can kill quickly.)** Pump the tank when the sludge layer at the bottom of the tank is 18 inches deep or the scum layer thickens to within three inches of the outlet baffle or sanitary tee outlet.

If the house is left vacant for six months each year, the pumping times mentioned above can be doubled, and if vacancy occurs for three to four months each year, the times can be increased by one-third. However, if a garbage disposal is used in the house, the period between pumping should be decreased by one-third. With an observation port and mea-

surements, the homeowner should be able to adjust the schedule based on the rate of solids accumulation.

Solids should be removed by a certified tank pumper and disposed of in an approved manner and location. Be sure that the pumper removes all of the material in the tank. It is not necessary to leave some sludge to “restart” the biological processes; nor is it necessary to scrub or disinfect the tank.

When not removed in a timely manner, overflowing solids from the tank accumulate in the drainfield clogging the soil and backing up the system. This damages the drainfield and may require constructing a new drainfield in a different location on the property. When the drainfield is clogged with solids, pumping the tank does not rejuvenate the drainfield. It provides only a few days of relief until the tank fills again and delivers wastewater to the drainfield. Some clogging of soil pores occurs quite slowly even in a properly maintained system, but this should not cause system failure for 20 years or longer.

Maintaining the Drainfield

The drainfield is the most important component of a conventional septic system. It provides final treatment of wastewater. The more water used in the household, the greater the possibility of having problems with the drainfield. Careful and regular maintenance of the tank extends drainfield life.

Water conservation reduces the amount of wastewater delivered to the drainfield. Keeping faucets and toilets from leaking with periodic checks and repairs certainly reduces wastewater. Do not allow foundation drains, roof gutters, and other surface waters to enter the septic system. Divert surface waters from flowing across the drainfield and reduce surface water ponding above the drainfield trenches by keeping soil levels at or slightly above the surrounding soil areas. Allowing heavy equipment to compact the soil above the trenches results in squeezing the soil pores which reduces water flow, increases clogging of pores, and reduces oxygen movement to the “active microbial zone” around the drainfield lines. Oxygen is necessary for the microbes to properly convert pollutants to harmless gases that diffuse upward to the atmosphere. Without this conversion, the wastewater is not fully purified and the pollutants remaining can enter the groundwater.

Practices that Reduce System Function

Be aware of products or household systems that can damage or reduce the effectiveness of the septic system. Reducing

garbage disposal use reduces the amount of solids going to the septic tank. Households with garbage disposal units produce about double the solids as those without such units.

The scum layer on top of the wastewater in the septic tank is primarily made up of oils, fats, and grease from the kitchen. When cooking oils or other types of oils enter the tank, they become part of the scum layer. Grease and fats (lard, beef tallow, butter, cheese, and cream) enter the tank and harden on the liquid surface. They can accumulate until they clog the tank inlet or outlet. When homeowners use hot water to flush grease or fat down the drain, it may pass on through the tank directly into the drainfield lines where it can rapidly clog soil pores in the drain lines. Even though these products are organic in nature, they are decomposed so slowly by microbes that further wastewater loading from the tank only speeds up clogging.

Placing even small quantities of pesticides, paint thinners, solvents, drain cleaners, poisons, and other harsh household chemicals into the septic system can kill the microbes in the tank and drainfield that decompose solids and purify the wastewater. Unfortunately, some organic solutions are not treated in the septic tank and can flow directly into the drainfield where they are not effectively treated by the soil before reaching the groundwater.

Septic Tank Aids

These products are sold in many forms, but they do not reduce the need to regularly remove solids from the septic tank by pumping. Many of these products include bacteria, yeasts, enzymes, mild acids, mild bases, or biodegradable organic solvents that are not harmful to the septic system, but some will damage the tank or drainfield or contaminate the groundwater.

Summary

A conventional septic system, consisting of a septic tank and drainfield, needs regular maintenance and careful attention to the materials added to it. Regular pumping of the septic tank is an important factor for preventing clogging of the drainfield by solids and for maintaining septic tank function. Careful attention to water usage and materials added to the system throughout the household decreases the load on the tank and increases the life of the septic system.

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