Maintaining Conventional Septic Systems

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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 sched-
ule 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. Allow-
ing 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. Oxy-
gen is necessary for the microbes to properly convert pollut-
ants 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 atten-
tion 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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