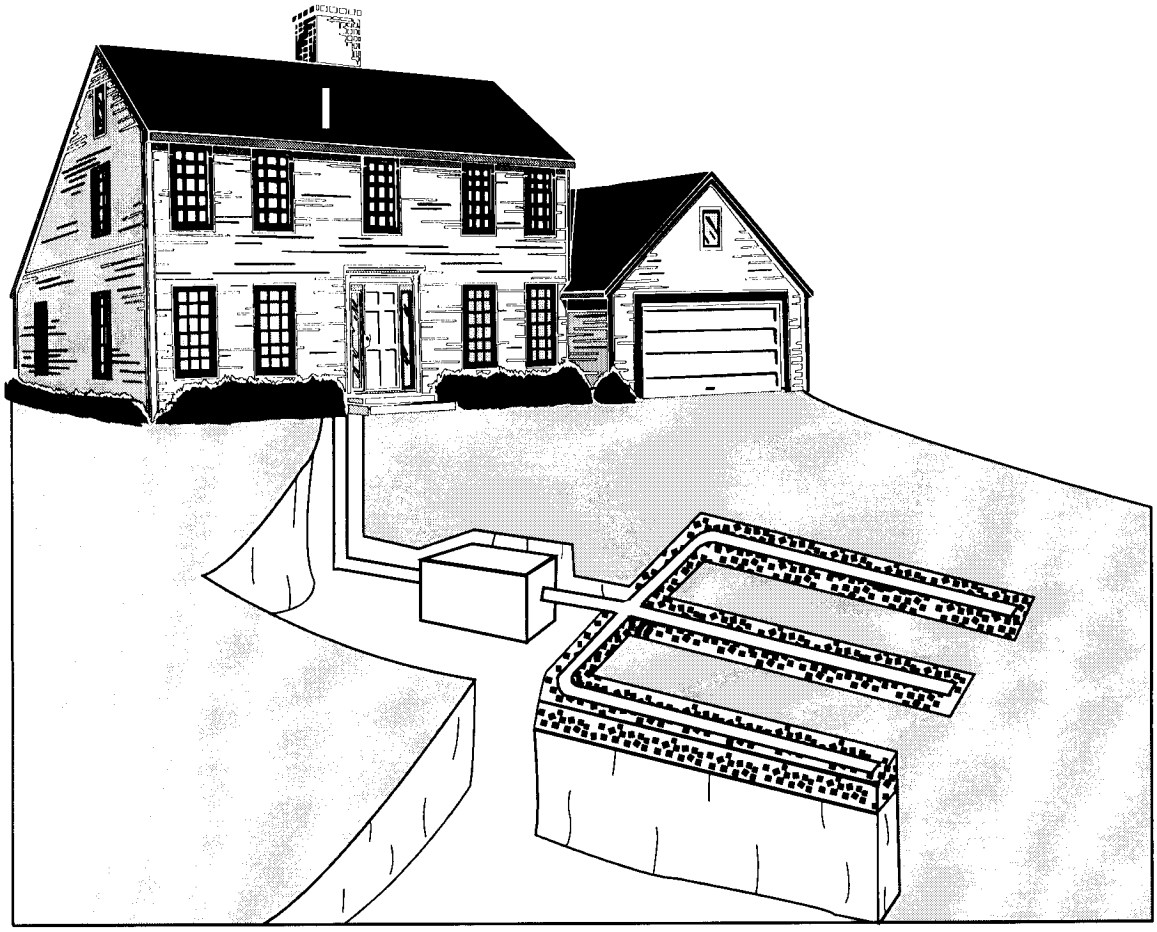
A Homeowner's Manual for Septic Systems

A Properly Maintained Septic System Will Last the Lifetime of the Home



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Division of Water Quality
Bureau of Nonpoint Pollution Control

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INTRODUCTION

Dear Homeowner:

This manual has been prepared by the New Jersey Department of Environmental Protection (NJDEP) to provide you with guidance and assistance with the operation and maintenance of your septic system. By following the simple guidelines in this manual, you not only enhance the performance and extend the life of your septic system, but you also are assisting the NJDEP with the protection of New Jersey's terrestrial and aquatic resources.

Sincerely,

Robert C. Shinn, Jr.
Commissioner

RULES AND REGULATIONS

The design, construction and operation of septic systems in New Jersey is governed by the Standards for Individual Subsurface Sewage Disposal Systems, N.J.A.C. 7:9A, also known as Chapter 199. The enforcement of the Chapter 199 regulations is accomplished through health departments throughout the state. You should always first consult your municipal or county health department when:

- You are experiencing any problems with your septic system.
- Planning any work on your septic system such as a repair or expansion.
- Planning any additions or expansions of your home or building.

If the health department cannot answer your questions or you need additional information, contact the NJDEP, Bureau of Nonpoint Pollution Control at (609) 292-0407.

HOW A SEPTIC SYSTEM WORKS

A septic system is composed of only two basic components: a septic tank and a disposal field. Each has an integral function in the treatment and disposal of domestic wastewater resulting from laundry and bathing, kitchen wastes and body wastes. This relatively simple system of wastewater renovation can effectively remove disease-causing pathogens and chemical nutrients from domestic wastewater for the life of the home when it is properly designed, constructed, operated and maintained.

The Septic Tank

Septic tanks are required to be large enough to hold the sewage for approximately two days before it is discharged to the disposal field. For a single family home with at least four bedrooms, the septic tank has to be at least 1,000 gallons in capacity. Add an additional 250 gallons of capacity for each bedroom over four.

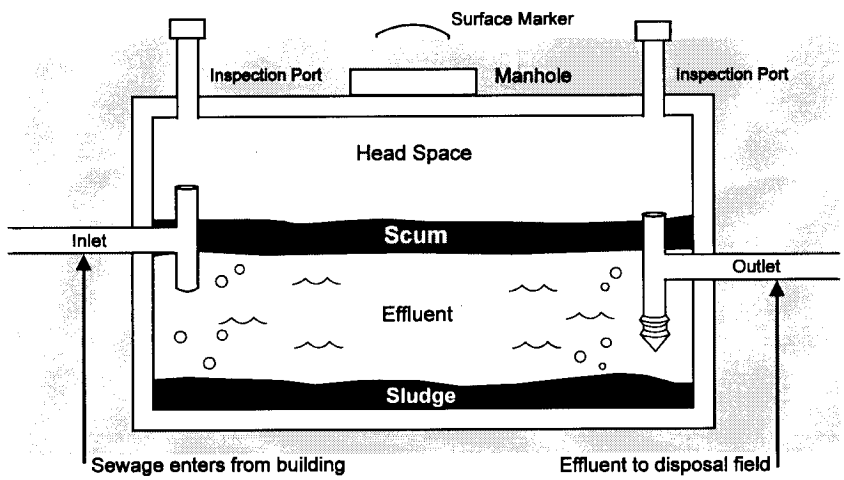
Sewage which enters the septic tank is retained for a short period of time, during which it breaks down into scum, sludge and liquid effluent. Most solid matter will settle to the bottom as sludge while buoyant grease, fats and hair will float to the surface and form a scum layer. Between these two layers is the clear liquid effluent which drains into the disposal field (see Figure 1). The solids in the septic tank will be digested and converted into gases by microorganisms such as bacteria.

The Disposal Field

Wastewater from the septic tank is passed on to the disposal field, also known as the drain field or leach field. The disposal field is a series of underground perforated pipes which overlay a bed of gravel approximately 12 inches in thickness. The perforated pipes, which are in individual trenches or grouped together into a single bed, distribute the wastewater throughout the entire area of the disposal field (see Figure 2 next page).

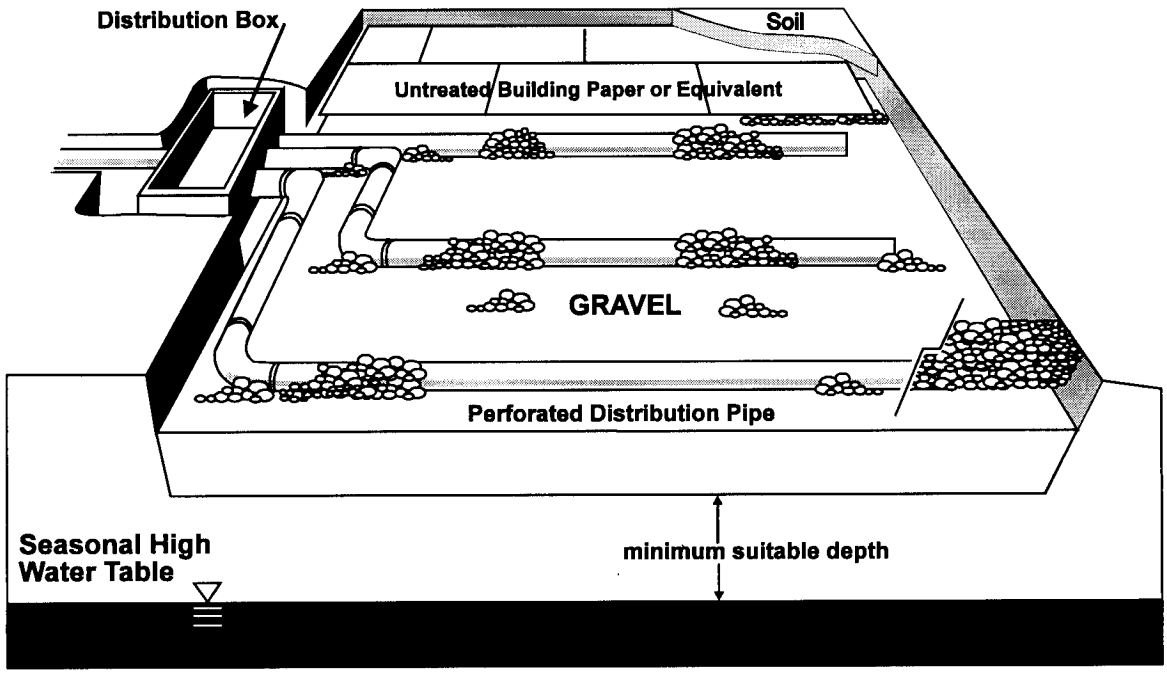
Near the bottom of the gravel bed of the disposal field, a slimy mass accumulates known as the biological clogging mat or biocrust. This biological layer, which occurs naturally in all properly designed, constructed and operated septic systems, consists of wastewater solids, microorganisms and the by-products of decomposition. The biological clogging layer represents a treatment medium for applied effluent in which larger microorganisms, such as bacteria, are filtered out along with suspended solids. Additionally, due to its reduced permeability, the biological clogging layer slows infiltration into the soil, and as such equilibrates effluent throughout the entire disposal field. Within the soil, smaller microorganisms such as viruses become immobilized upon soil particles and die, while wastewater nutrients such as phosphorus and some forms of nitrogen are adsorbed and become bound within the soil.

FIGURE 1: Typical Septic Tank (cross-section)



CAUTION: Gases generated within the septic tank can accumulate to toxic concentrations which have been fatal to humans, so no person should ever enter a septic tank or even just peer into the tank through the manhole without exercising extreme caution.

Figure 2: Typical Disposal Bed (cross-section)



RECOMMENDED OPERATION AND MAINTENANCE PRACTICES

Septic system owners are unique in that unlike areas served by regional sewerage systems, the septic system owner is solely responsible for the daily operation and maintenance of the wastewater treatment and disposal system. By adhering to simple and straight forward guidelines, the septic system owner can ensure years of trouble-free operation with a minimal degree of maintenance.

SEPTIC SYSTEM OPERATION

- **DO** practice water conservation where possible.

  Excessive water use can compromise your septic system's ability to treat and dispose of wastewater. Excessive water entering the disposal field can result in hydraulic overloading and a reduction in infiltrative capacity. Excess volumes of water entering the septic tank can affect its ability to retain solids and result in carry-over and clogging within the disposal field.

- **DO** try to distribute dish washing and laundry through out the week rather than all at once during one or two days.

- **DO** avoid showering and bathing at times when dishwashers and laundry are in use.

- **DO** fix all leaking faucets and toilets.

- **DON'T** discharge floor drains or sump pumps into septic systems.

- **DON'T** pour cooking oils, fats or grease into the kitchen sink. These items congeal in either the internal home plumbing or the septic tank, which will result in premature maintenance on these items.

- **DON'T** add a garbage grinder to a home with an existing septic system. The ground up food products will substan tially increase the suspended solids, biomass and hydraulic load to the septic tank, which can result in decreased operating efficiency in the disposal field or increased frequency for pumping of the septic tank. Many communities have local ordinances which prohibit the use of garbage grinders by homes served by septic systems. If in doubt, check with your local health department.

- **DON'T** flush inert or non-biodegradable items down sinks or toilets. Items such as disposable diapers, cat litter, cigarette filters, sanitary napkins, paper towels, condoms or similar materials may result in clogging of the plumbing and will result in the need to prematurely pump the septic tank.

- **DON'T** flush toxic substances down sinks or toilets. Introduction of substances such as waste motor oil, oil-based or acrylic paints, varnishes, photographic solutions, pesticides, insecticides, paint thinners, and organic solvents and degreasers into a septic system not only compromises its performance, but also contributes to ground water pollution.

- **DON'T** use septic system cleaners that contain banned substances. Under the New Jersey Water Pollution Control Act, the sale or use of septic system cleaners containing *restricted chemical materials* is illegal. A *restricted chemical material* is any chemical material containing more than 1% by weight of any of the following:

  HALOGENATED HYDROCARBONS (ALIPHATIC OR AROMATIC) including but not limited to: trichloroethane, trichloroethylene, tetrachloroethylene, methylene chloride, halogenated benzenes and carbon tetrachloride.

  ANY AROMATIC HYDROCARBON, including but not limited to: benzene, toluene and naphthalene.

  ANY PHENOL DERIVATIVE (IN WHICH A HYDROXYL GROUP AND TWO OR MORE HALOGEN ATOMS ARE BONDED DIRECTLY TO A 6-CARBON AROMATIC RING) including but limited to: trichlorophenol or pentachlorophenol.

  Any substance containing acrolein, acrylonitrile, or benzedine.

SEPTIC SYSTEM MAINTENANCE

- **DO** maintain a diagram of the location of all components of your septic system including the septic tank, any connection lines and pipes, distribution boxes and disposal field. For newly constructed septic systems, this can be a copy of the design plans. For older existing systems, simply diagramming the location to septic system components, measured from a common point on the building, is sufficient. Knowledge of the location of septic system components can prevent accidental damage resulting from machinery and excavating tools. Additionally, ready knowledge of the location of septic system components facilitates maintenance and repairs or alterations when necessary.

- **DO** pump your septic tank. Solids are always accumulating in an operating septic tank because the rate of microbial decomposition is slower than the rate at which sewage is added. Failure to remove these solids, also known as sludge, at an adequate frequency compromises the ability of the septic tank to function properly and may jeopardize the performance of the disposal field.

  NJDEP recommends that septic tanks be pumped out completely at least once every 3 years by a solid waste hauler registered with NJDEP. This frequency of pumping should be increased for older homes with smaller septic tanks (< 1,000 gallons). Pumping should include removal of all liquid and solid matter within the septic tank. It is not necessary to leave any sludge within the septic tank as a start-up for future use. All domestic wastewater has an adequate and abundant population of microorganisms to ensure that a properly sized and maintained septic tank operates properly.

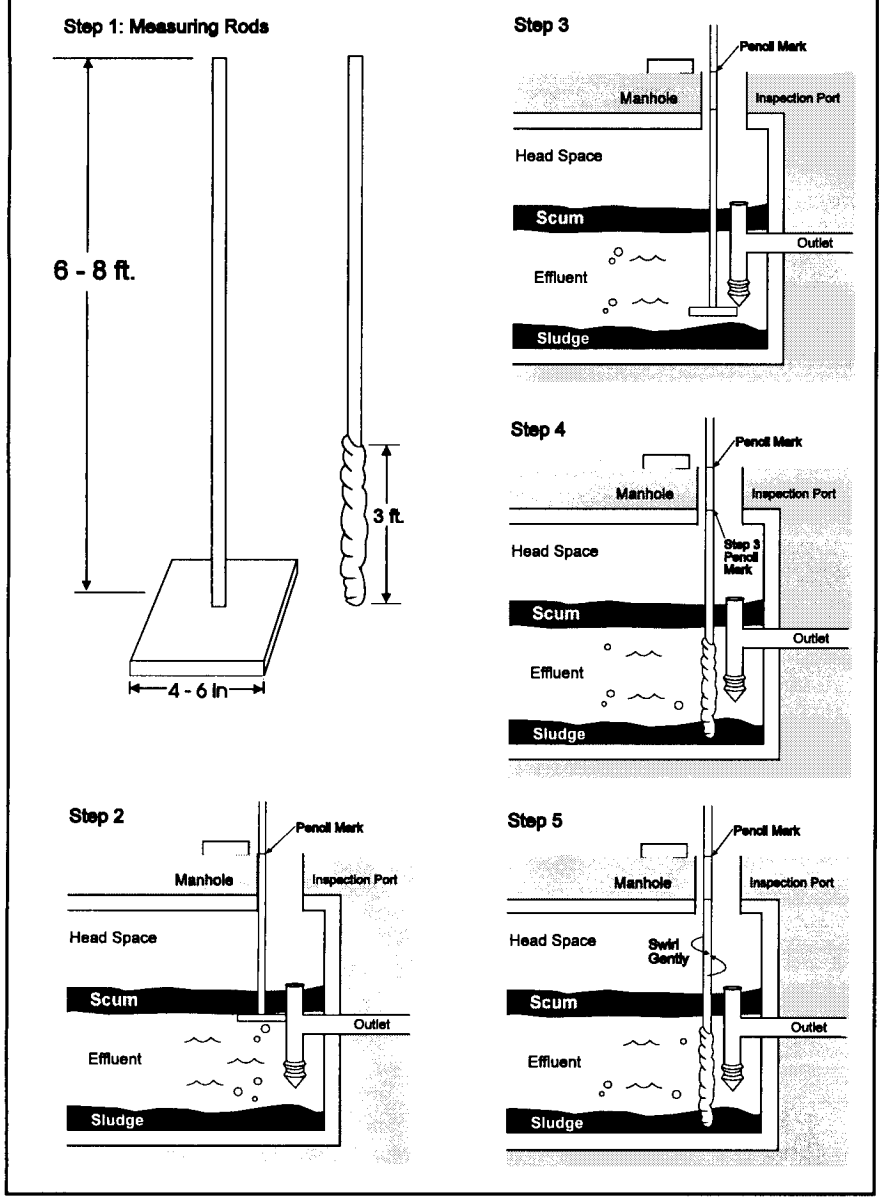
Another method of determining whether your septic tank needs to be pumped is to physically measure the thickness and depth of the scum layer and sludge layers relative to the depth of the bottom of the outlet baffle of the septic tank. This process isn't as hard as it sounds and can be accomplished by the property owner simply by the following steps (refer to Figure 3 next page)

STEP 1 Construct two measuring rods each approximately 8 feet in length (or an adequate length to reach the bottom of the septic tank). On the end of one measuring rod, firmly affix a 4 to 6 square inch board, 1/4 to 1/2 inch in thickness, oriented perpendicular to the rod. The square board is known as the foot of the rod. On the other rod, cover the bottom 3 feet with a cloth or towel wrap.

STEP 2 Measure the depth of the bottom of the scum layer using the measuring rod with the foot affixed to the bottom. Lower the measuring rod into the septic tank until some resistance is felt (this will be when the bottom of the foot is in contact with the top of the scum layer). Gently force the foot all the way through the scum layer then bring the rod back until you feel the resistance of the top of the foot against the bottom of the scum layer. Mark this depth on the measuring rod (a convenient reference point could be the top of the manhole or inspection port riser). Keep the measuring rod in the septic tank and proceed to STEP 3

STEP 3 Continuing from STEP 2, measure the depth to the bottom of the outlet baffle. Lower the measuring rod with the foot affixed to the bottom further until the bottom of the outlet baffle is felt. Again, using the same reference, mark this depth on the measuring rod.

FIGURE 3: Checking Sludge and Scum Levels in Your Septic Tank



After withdrawing the measuring rod with the foot affixed to the bottom from the septic tank, transfer the mark measured in STEP 3 to the other measuring rod with the bottom 3 feet covered with the cloth or towel wrap.

STEP 4 Measure the depth to the bottom of the septic tank using the measuring rod with the bottom 3 feet covered with the cloth or towel wrap. Gently lower the measuring rod through the sludge layer to the bottom of the septic tank. Mark this depth on the measuring rod making sure to use the same reference point as in previous steps. Keep the measuring rod in the septic tank and proceed to STEP 5.

STEP 5 Continuing from STEP 4, keep the measuring rod at the bottom of the septic tank for at least one minute, during which time the rod is to be gently swirled to help the sludge to adhere to the cloth or towel wrap. Withdraw the measuring rod from the bottom of the tank. A distinct black layer will be easily recognized.

What Do the Measurements Mean?

• The depth of the scum layer relative to the bottom of the outlet baffle can be calculated by measuring the distance between the marks taken in STEP 2 and STEP 3 on the measuring rod with the foot affixed to the bottom.

If this distance is less than 3 inches, the septic tank should be pumped.

• The distance from the top of the sludge layer to the bottom of the outlet baffle can be calculated by first measuring the distance between the mark transferred in STEP 3 and the mark measured in STEP 4 on the measuring rod with the bottom 3 feet covered with the cloth or towel wrap. Take this distance and subtract from it the value calculated in STEP 5.

If this distance is less than 8 inches, the septic tank needs to be pumped.

■ **DO** pump your grease trap. Grease traps are installed in restaurants, cafeterias and institutional kitchens in order to prevent large quantities of grease from entering the septic system. Failure to pump a grease trap at an adequate frequency could compromise the performance of both the septic tank and disposal field.

NJDEP recommends that grease traps be pumped whenever 75 percent of the grease retention capacity has been reached. For facilities which generate large quantities of grease, grease traps may require pumping as frequently as once a week to once every two to three months. Pumping of grease traps shall be performed by a solid waste hauler registered with NJDEP.

■ **DO** keep a permanent written record of all septic tank pumping, inspection, repairs or alterations to your septic system. The name of the hauler, contractor or professional engineer who performs the work should be retained in the event that it is necessary to contact them in the future.

■ **DON'T** drive on, or park vehicles or trailers over the area of the disposal field. The weight of these units can cause

physical damage such as broken connecting pipes, distribution boxes, manifolds and laterals. Also, additional compression of the underlying soil may reduce its effective infiltrative capacity.

■ **DON'T** plant trees or other vegetation with extensive and deep root systems. Tree roots are capable of exerting enough pressure to rupture or dislodge distribution boxes, connecting pipes, manifolds and laterals. Grass is the best vegetative cover for disposal fields. It has a great capacity to consume water and does not have a woody root system which can physically disrupt the disposal field.

■ **DON'T** divert surface water runoff towards the disposal field. The increased volume of water infiltrating into the disposal field can result in hydraulic overloading and ultimately septic system malfunction.

■ **DON'T** construct driveways, parking lots, accessory build ings, additions to the main building, decks or patios which encroach upon any component of the septic system. The presence of any of the above in immediate proximity to a septic system may adversely affect the functioning of the system or interfere with system maintenance.

IF YOUR SEPTIC SYSTEM FAILS

The homeowner with a septic system must not only be vigilant in how they operate and maintain their septic system, but must also be cognizant of indications of impending septic system failure. These indications may include:

■ Toilets backing up into the house or are very slow to drain. This can be a sign that the septic tank requires pumping and/or the disposal field is hydraulically overloaded so that water is draining into the subsoil at a slower rate than it is being generated by the household.

■ Sewage or effluent is seeping into the building or its basement. When the seepage is sewage and not ground water, it will have a distinctive odor. This condition could be the result of a broken building sewer which connects the internal plumbing of the home to the septic tank. Additionally, for older systems, the presence of a shallow water table may cause poorly treated effluent to enter the building.

■ Effluent is ponded on the ground surface in the area of the disposal field. This is most noticeable by the presence of the odor of sewage, or an abnormally lush vegetative growth over the area of the disposal field even in periods of low rainfall. This can be caused by either an overloading of the septic system because of abnormally high water usage, solids carry over from the septic tank, an undersized disposal field, or a shallow water table.

■ Water from the homeowner's potable well has developed an unpleasant taste, the water has a foul odor or an analysis of the well water indicates contamination. If no laboratory analysis has been performed recently on your well water, it should be done immediately to determine the specific nature of the contamination problem. Any laboratory analysis of home well water should include a MS/GC scan for organic chemicals.

If you recognize any of the above indications of septic system failure, you should contact your local health department prior to taking any action to ascertain possible corrective measures and the need for approvals or permits.

There are many commercial products marketed which claim to increase the capacity and performance of septic tanks and disposal fields. These products are usually either unnecessary or potentially detrimental to the performance of your system.

■ **DON'T** add commercial septic tank additives. Human wastes or wastes of household origin which flow into a septic tank contain an adequate variety and quantity of microorganisms, such as bacteria, to maintain proper operating conditions within a septic tank.

■ **DON'T** add products containing sodium hydroxide, potassium hydroxide or hydrogen peroxide into the septic tank or directly into the disposal field. These chemicals will not enhance the long term performance of the septic system and in severe cases, may adversely impact system performance.