



## Locating Your Septic System

If you do not know the location of your septic tank, begin by observing in what direction your main sewer pipe leaves your basement or crawlspace. Begin probing the soil with a metal rod 10 to 15 feet away from the foundation of your home. A metal detector may also help you locate your septic system, as most concrete tanks are constructed with steel rod reinforcements (re-bar). Sometimes it is easier to locate the drain field first and work backwards towards the tank. To locate the drain field look for the following clues:

- ▶ an area where grass and vegetation is different than surrounding area (this can either be improved growth or an area of poor growth).
- ▶ an area of slight depression or a slight mound.
- ▶ an area that is soggy, when the surrounding area is dry.

## Septic System Do's & Don'ts

- ▶ **do** conserve water in your home every chance you get.
- ▶ **do** repair leaky faucets and toilets.
- ▶ **do** divert down spouts and other water run-off away from drain field.
- ▶ **do** follow a regular maintenance schedule
- ▶ **do** call a professional to make major repairs to, or "pump" your septic tank.
- ▶ **DO NOT** plant any ground cover, other than grass or shallow rooted plants, over drain field.
- ▶ **DO NOT** flush solid waste or use a garbage disposal at the kitchen sink.
- ▶ **DO NOT** overload the system. Space activities that result in massive drainage throughout the day.
- ▶ **DO NOT** put any of the following down any drain or toilet:

fats or oils      paints  
pesticides      acids  
bleach (*in large quantities*)  
solvents      cotton swabs  
kitty litter      cigarette butts  
baby wipes      diapers  
sanitary napkins      tampons  
*(or any other non-biodegradable hygiene, health or household products)*



## A Warning on Detergents and Septic Additives



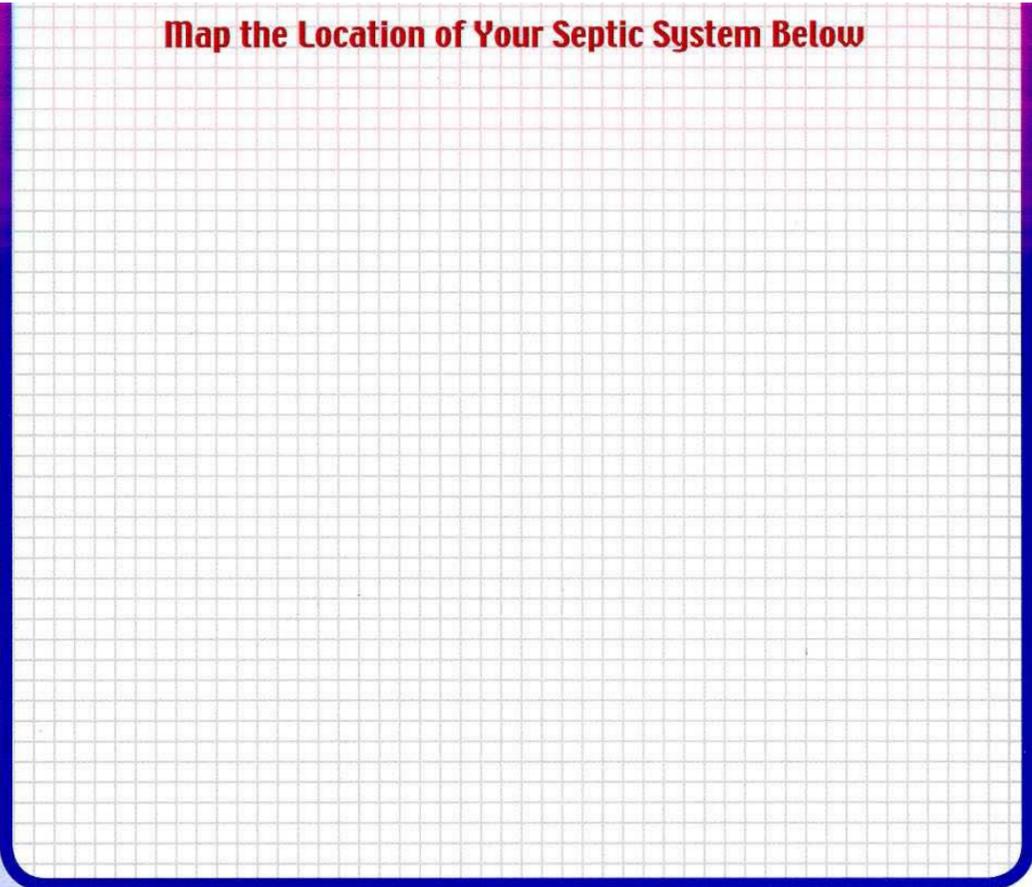
**Overuse** of household detergents and cleaning products will kill the organisms that make up the "natural filter" of your septic tank and drain field system. Such chemicals will also make their way into the groundwater, contaminating streams, lakes, municipal water supplies or your own well directly.

**Additives** for proper septic function are **not** needed or recommended. Normal sewage contains the necessary organisms to initiate and maintain proper septic function.

## POSSIBLE SIGNS OF TROUBLE

- ▶ A wet area or standing water occurs above the absorption field. This situation can develop when sludge particles clog the absorption field, when tree roots or broken pipes keep the waste water from dispersing through the entire drain field, or when water use in the house regularly exceeds the design capacity of the system. When these conditions occur, waste water does not move through the soil as it should, and instead rises to the surface, creating a serious health risk and odor problems.
- ▶ Toilets run slowly or backup: in the worst cases, the basement is flooded with sewage. This can be the result of plugged sewer lines to the tank, a plugged inlet or outlet pipe, a full septic tank, or a failed absorption field.
- ▶ Septic odors occur in the house, above the tank and absorption field, or escape from the vent pipe. If the system is operating properly, there should be no odors. If there are odors, it can be an early warning sign that the system is failing.
- ▶ The septic tank has not been pumped out in the past five years. Even if the system appears to be working well, sludge may have built up to the point where waste water is released without sufficient time in the tank for treatment and settling of particles. This situation may result in pollution of ground water or cause eventual clogging of the absorption field.

## Map the Location of Your Septic System Below



## Septic System Risks

Use this checklist to decide if your septic system poses environmental risks. Work to bring all of your septic system practices to the low-risk level. If any item in the significant-risk or high-risk column applies to you, take steps to correct the situation. (See the back of this folder for resources.)

| Location and Maintenance  | Low risk  | Significant risk   | High risk  | Your risk   |
|---|---|--|--|---|
| Capacity of system  | Tank is designed to handle more wastewater than required, based on the size of the home.  | Tank capacity just meets load requirements, but factors indicating system overload are watched closely. Water conservation measures are taken. | Bathrooms, bedrooms or water-using appliances are added without reexamining the capacity of the wastewater system.   | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Separation distance   | Drainfield is at least 100 feet from any well or surface water.   | Drainfield is between 50 and 100 feet from any well or surface water.  | Drainfield is less than 50 feet from any well or surface water.  | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Age of system or holding tank<br>Year installed:                      | System is five years old or less.<br>(year installed) _____   | System is between six and 20 years old.<br>(year installed) _____  | System is more than 20 years old.<br>(year installed) _____  | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Effluent filter   | An effluent filter is installed and cleaned regularly.  | An effluent filter is installed but not cleaned often enough.  | There is no effluent filter installed on the septic tank.  | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Safety devices  | An alarm on the pumping chamber or holding tank alerts if the tank is full or power has been cut off to the pump.   |  | There is no alarm to indicate overflow or that power has been cut off to the pump.   | <input type="checkbox"/> Low<br><input type="checkbox"/> High   |
| Backflow protection   | A backflow valve is installed to prevent backup during floods.  |  | No backflow valve is installed to prevent backup during floods.  | <input type="checkbox"/> Low<br><input type="checkbox"/> High   |
| System Care   | Low risk  | Significant risk   | High risk  | Your risk   |
| Map and records   | I keep a map and good records of repairs and maintenance.   | The location of my tank and date of last pumping are known but not recorded.   | The location of my system is unknown. I do not keep a record of pumping and repairs.   | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Tank pumping (including holding tanks)                                | The septic tank is pumped on a regular basis as determined by an annual inspection, or about every 3 to 5 years. The holding tank is pumped as needed.                | The septic tank is pumped, but not regularly.  | The septic tank is not pumped. The holding tank overflows or leaks between pumpings.   | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Condition of baffles  | The tank and baffles are inspected for cracks; repairs are made promptly.   |  | The condition of the tank and baffles is unknown.  | <input type="checkbox"/> Low<br><input type="checkbox"/> High   |
| Drainfield protection   | Vehicles and other heavy objects or activities are kept from the drain field area.  | Occasionally, the drainfield is compacted by heavy objects or activities.  | Vehicles, livestock, or other disturbances are permitted in the drainfield area.   | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Diverting surface water   | All surface runoff is away from the drainfield.   | Some surface water flows into the drainfield area.   | Runoff from land, rooftops, driveways, etc. flows into the drainfield.   | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Plantings over the drainfield   | Grass or other shallow-rooted plantings are over the drainfield.  |  | Trees and shrubs are growing on or near the drainfield.  | <input type="checkbox"/> Low<br><input type="checkbox"/> High   |
| Signs of trouble  | Household drains flow freely. There are no sewage odors inside or outside. Soil over the drainfield is firm and dry. Well water tests negative for coliform bacteria. | Household drains run slowly. Soil over the drainfield is sometimes wet.  | Household drains back up. Sewage odors can be noticed in the house or yard. Soil is wet or spongy in the drainfield area. Well water tests positive for coliform bacteria. | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| System Care   | Low risk  | Significant risk   | High risk  | Your risk   |
| Solid wastes  | There is no garbage disposal in the kitchen. No grease or coffee grounds are put down the drain. Only toilet tissue is put in the toilet.                             | There is moderate use of a garbage disposal and some solids are disposed of down the drain.  | There is heavy use of a garbage disposal and many solids are disposed of down the drain. Paper or plastic products are flushed down the toilet.                            | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Cleaners, solvents and other chemicals (also applies to holding tank) | Household chemicals (paints, cleaning products) are used with care. No solvents, fuels or other hazardous chemicals are poured down the drain.                        | There is occasional disposal of hazardous chemicals in the wastewater system.  | There is heavy use of strong cleaning products that end up in the wastewater. Hazardous chemicals are disposed of in the wastewater system.                                | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Water conservation  | Only water-conserving fixtures and practices are used. Drips and leaks are fixed immediately.   | Some water-conserving steps are taken (such as using low-flow shower heads or fully loading washing machine and dishwasher).                   | Standard high-volume bathroom fixtures (toilets, showers) are used. No effort is made to conserve water. Leaks are not repaired.   | <input type="checkbox"/> Low<br><input type="checkbox"/> Significant<br><input type="checkbox"/> High |
| Water usage   | Laundry and other major water uses are spread out over the week.  |  | Several water-using appliances and fixtures are in use in a short period of time.  | <input type="checkbox"/> Low<br><input type="checkbox"/> High   |

Assess Your Risk Level ▶



Maintenance of a Non-Conventional Wastewater Treatment System - *continued*

- Effluent from sump pumps and roof drains should not be discharged in the vicinity of the drain field, as this could keep the soil too wet, reducing its capacity to absorb the waste water and causing it to puddle on the surface, creating an environmental and health hazard.

It is helpful to draw a diagram of the septic system that shows the location of the house, the septic tank and its manholes, and the drain field. This diagram will make it easier for a qualified maintenance worker to check and maintain the system. Sketch a diagram showing the location of your septic tank and drain field in relation to your house. Measure exact distances from at least two reference points (such as the corner of the house and a tree) if possible. This need only be a sketch, although the more accurate the drawing, the more helpful it will be in the future, so include measurements of distance wherever possible.

Keep a record of maintenance on your system. It is suggested that you include who maintained the system, what was done, the date of the work, and the status of the system. Use the table below to record maintenance activities.

| Date | Baffle Checked | Effluent Filter Cleaned | Sludge Depth | Scum Thickness | Tank Pumped | By |
|------|----------------|-------------------------|--------------|----------------|-------------|----|
|      |                |                         |              |                |             |    |
|      |                |                         |              |                |             |    |
|      |                |                         |              |                |             |    |
|      |                |                         |              |                |             |    |

Another good method for handling records is to keep your septic system permit and maintenance related items such as pump out receipts in a large envelop. Some folks find it convenient to hang the envelop in the utility room.

References:

Montana Standards for Subsurface Wastewater Treatment Systems. Department Circular DEQ 4. 2002.

Onsite Wastewater Treatment System Manual. EPA/625/R-00/008. U.S. EPA. 2002

Septic Tank and Drainfield Operation and Maintenance. MontGuide Fact Sheet # 9401 Montana State University Extension Service. 1999.

Septic System Information for Rhode Islanders. University of Rhode Island Cooperative Extension Service. 2001.



# How Septic Systems Work



## Work

November 2006

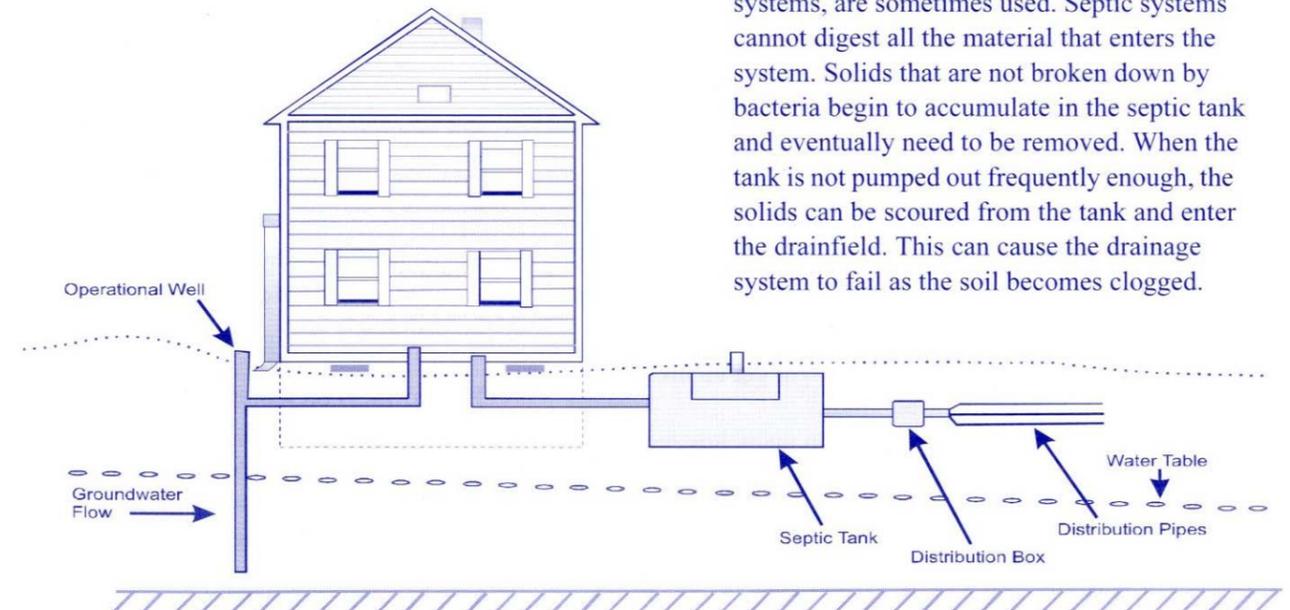
**T**he septic system is a method of treatment and disposal of household wastes for those homeowners who are not part of a municipal sewage system.

A conventional septic system consists of a septic tank and a drainfield. A septic system works by allowing solids to settle out of wastewater and begin the process of decomposition in the septic tank. Bacteria, which are naturally present in all septic systems, begin to digest the solids that have settled to the bottom of the tank, transforming up to 50 percent of these solids into liquids and gases. The liquids within the tank rise and are

discharged through the outflow pipe where they enter the drainage system also known as the leachfield or drainfield.

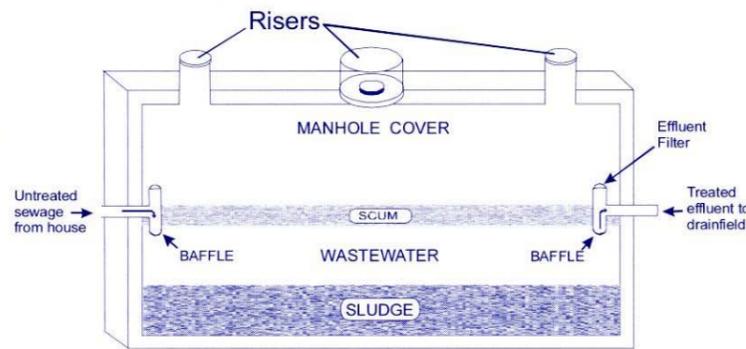
Final treatment of the effluent occurs here as the soil absorbs and filters the liquid and microbes break-down the rest of the waste.

Most septic systems, especially older ones, are conventional systems that use gravity to distribute the effluent from the tank. When site conditions are not appropriate for a conventional system, other types of systems, such as pressure dosed, sand filter, or mound systems, are sometimes used. Septic systems cannot digest all the material that enters the system. Solids that are not broken down by bacteria begin to accumulate in the septic tank and eventually need to be removed. When the tank is not pumped out frequently enough, the solids can be scoured from the tank and enter the drainfield. This can cause the drainage system to fail as the soil becomes clogged.



These problems are often costly to fix and can pose a risk to public health. Seepage from inadequate or failing septic systems can contaminate both ground and surface waters.

Septic tanks installed in Montana are now required to be equipped with an effluent filter. Effluent filters are typically on the outlet tee of the septic tank and inhibit suspended solids from entering the drainfield. Solids that get into the drainfield can clog it and lead to drainfield failure. Effluent filters are found on all newer septic tanks but often are not found on older tanks. Septic tank pumpers may advise owners to consider installing an effluent filter on older tanks to help ensure the longevity of the drainfield.



Routine septic tank maintenance cannot occur if reasonable tank access (usually one or two risers that extend to the ground surface) is not provided. Moreover, emergency repairs in the winter can be totally stalled when septic tank access is blocked by frozen soils. If your tank is completely buried, consider asking your pumping contractor what he recommends for improved access.

- Risers make it easier to inspect and maintain your septic system, and you don't have to search for the tank.
- Risers avoid the need to dig up the lawn for routine pumping.
- Risers are required in many jurisdictions for new installations and in all cases where effluent filters are used.

Risers protect your investment by reminding you of the need for regular maintenance.

### Maintenance of a Conventional Septic Tank

All septic tanks should be checked on an annual basis to ensure they are working properly. Baffles, specially designed pipes which allow the sewage into and out of the tank, need to be checked to ensure they are in place and not damaged. The level of sludge (the material that accumulates at the bottom of the tank) needs to be measured to determine when the system should be pumped (see MontGuide Fact Sheet #9403 available from the Montana State University Extension Service). Most health departments and pumping contractors advise homeowners to routinely have their septic tanks pumped out every three to five years. The frequency with which your tank needs to be pumped may vary depending on the size of the tank and number of people in the household:

| Suggested Pumping Frequency (Years) |                                |     |     |
|-------------------------------------|--------------------------------|-----|-----|
| Tank Size (gal.)                    | Household Size (No. of People) |     |     |
|                                     | 2                              | 4   | 6   |
| 1000                                | 5.9                            | 2.6 | 1.5 |
| 1500                                | 9.1                            | 4.2 | 2.6 |
| 2000                                | 12.4                           | 5.9 | 3.7 |

The servicing of effluent filters is relatively simple. The filter should be removed and rinsed down while being held over the tank opening. Care should be taken not to spray the filter growth onto surfaces that might be contacted by the unprotected person. In addition, the person servicing the filter should protect himself or herself from back spray. Servicing of the filter can be performed by a licensed septic pumper familiar with the cleaning precautions and procedures.

Homeowners on septic systems should utilize a licensed septic pumper to service their system. This requirement is primarily for homeowners safety, since septic systems produce harmful fumes and can be dangerous to clean for those not adequately prepared. Using qualified professionals also reduces the chance of

improper monitoring or possible damage to the system during pumping. Contact either your local sanitarian for a list of licensed pumpers in your area or for more information on system maintenance in general.

### Maintenance of a Non-Conventional Wastewater Treatment System

Non-conventional systems such as those equipped with sand filters, trickling filters, or aerobic units should follow the specific recommendations provided in their owner's manual. These types of systems are required to be operated under a maintenance contract, in fact, a service contract for on-going service and maintenance of the entire wastewater system is required.

The use of additives to help maintain the system is not recommended. They will not extend the amount of time required between pumping. Although these additives do indeed dissolve oils and grease, this only increases the likelihood that these materials will be carried over to the drainfield rather than remaining in the septic tank where they can be slowly broken down and pumped out at regular intervals. As mentioned earlier, the most effective method of breaking down the solid matter in the sewage is allowing the naturally present bacteria to digest it.

There are many ways to prolong the life of your septic system and lengthen the period between pumpings. Household water use directly controls how quickly waste travels through a conventional system. Wastewater that enters the tank requires time to allow the solids to settle to the bottom. The higher the volume of water that is introduced to the system, the less opportunity the wastewater has to settle in the septic tank and the less opportunity the bacteria have to break down the solids. Therefore, limiting the use of water in the home will go far in prolonging the life of the system.

- Reduce household water use.
- Use water-saving showerheads and faucet aerators.
- Install low-flow toilets.
- Repair leaking toilets (place a few drops of food coloring into the toilet tank to detect water leakage into the bowl).
- Make sure sump pumps and roof drains are not connected to the sewage system.
- Use front load washers and space out the time between washings.

Controlling what goes into the water that enters the system is just as important as reducing the amount of water that flows into the system.

- Never dispose of toxic or hazardous chemicals by dumping them down the drain as they have the potential to contaminate groundwater.
- Refrain from putting any plastic, cloth, or unnecessary paper products into the sewage system.
- Avoid using garbage disposals as they accelerate the accumulation of solids in the holding tank. Especially avoid putting any grease or oil in the disposal or drain. These can clog pipes and damage your system.

The drainage field is an often overlooked aspect of the septic system, yet it is as important as the tank for the proper operation of the entire system. Homeowners can take several measures to ensure their drain field is properly maintained.

- Never park vehicles or place other large objects on the drain field, as this will compact the soil and reduce its ability to treat wastewater. It also may damage the network of drain pipes within the field, causing them to need to be replaced.
- Avoid planting water-loving shrubs with deep root systems or trees near the drain field, as roots could damage the pipes, or they could change moisture levels within the soil causing it to be less effective.

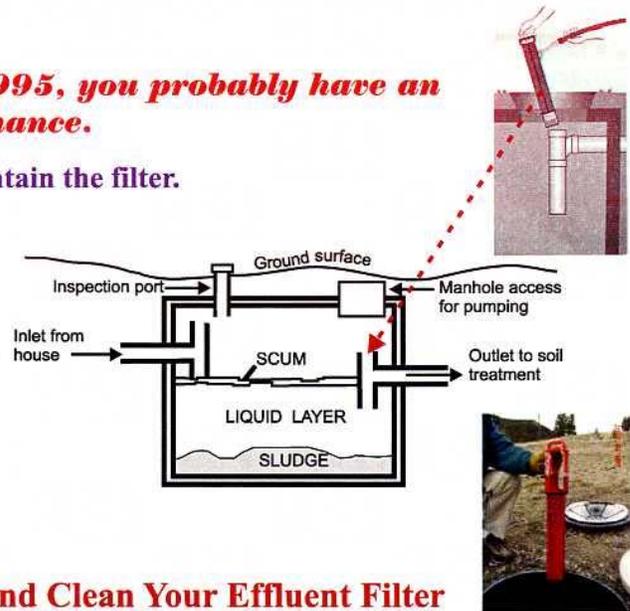


## Your septic tank may have an Effluent Filter...

**If your septic tank was installed after 1995, you probably have an effluent filter that needs regular maintenance.**

**As a property owner, it is your responsibility to maintain the filter.**

You may wish to contract with a licensed septic tank pumper to clean your effluent filter on a regular basis; some homeowners will tackle this job themselves. Properly cleaning the effluent filter may be done by washing it off with a garden hose into the septic tank. Cleaning frequency may range from as often as twice a year to once every three years depending on design and how much wastewater your home generates. A number of potential problems may arise without warning if you do not maintain your effluent filter including sewage backing up into your home or the upwelling of sewage through the tank lid into the yard.



**Remember, pump Your Septic Tank and Clean Your Effluent Filter**

## If you have a septic system...

**Septic systems can provide long-term, effective treatment of household wastewater if properly designed, constructed, and maintained.**

### Things to keep in mind:

- ✓ Inspect your system (every 1 to 3 years) and pump your tank necessary, generally every 5 years.
- ✓ Use water efficiently.
- ✓ Don't dispose of household hazardous wastes in sinks and toilets.
- ✓ Plant only grass over and near your septic system. Roots from nearby trees or shrubs might clog and damage the drainfield.
- ✓ Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage pipes, tank, or other septic system components.

**For more information, contact:**

U.S. Environmental Protection Agency,  
[www.epa.gov/owm/onsite](http://www.epa.gov/owm/onsite)



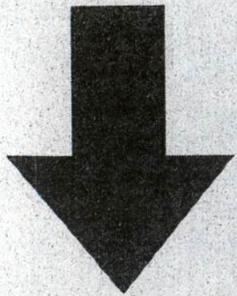
**Not in My Septic System!**

### **X Cloggers**

diapers, cat litter, cigarette filters, coffee grounds, grease, feminine hygiene products, etc.

### **X Killers**

Household chemicals, gasoline, oil, pesticides, antifreeze, paint, etc.



# Q & A

► **What's in these additives that I'm being encouraged to buy for my septic system?**

There are three general types of additives. **Inorganic** additives are generally strong acids or alkalis. They are sometimes marketed on the basis of their ability to open clogged drains - they have the same active ingredients as popular drain cleaners. Packages of these materials usually bear warnings stating that they are caustic or corrosive. **Organic solvents** have also been sold as septic system additives. These are the same chemicals that have been used as household "cleaning fluid," or for cleaning machine parts. These products

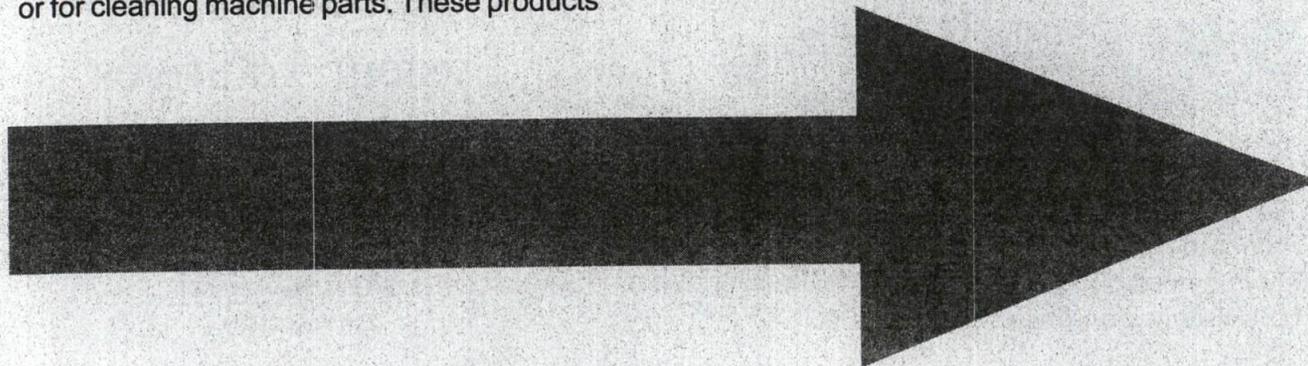
give off fumes, and their packages include warnings against breathing the vapors. **Biological** additives are mixtures of enzymes and harmless bacteria with a stabilizing agent to enhance product shelf life. Some of the biological products include yeast cultures.

► **Is there any reason to be cautious of the commercial additives?** Both the inorganic additives and the organic solvents are definitely harmful. Your septic tank is a biological system - it treats household wastewater by breaking it down using bacteria and other microbes. Strong acids and alkalis interfere with the activity of the microbes, and in high doses, can kill them and sterilize the tank for days at a time. This means raw sewage goes directly to the drainfield, where it can clog the soil and set the stage for failure of the drainfield. Repeated doses of acids or alkalis can also corrode the plumbing and the septic tank itself. Organic solvents are effective at cleaning grease from pipes, but they too are toxic to the septic system microbes. What's worse, these solvents pass through the system essentially unchanged, leach into the groundwater, and can form a plume of hazardous waste for which the homeowner is liable.

► **What about the biological additives?** A great deal of information has been collected by the makers of the biological products, but there have been very few studies conducted by independent entities. None of the information available to the public indicates that the biological products do any harm to septic systems or laboratory models of septic tanks. Some of the studies have shown enhanced biological activity breaking down wastewater; others have not.

► **Can these products really do away with the need to pump the septic tank, or right my system when it has suffered an upset?** One of the most important jobs of the septic tank is to capture inert solid matter so that it doesn't move on and clog the drainfield. Wastewater from every household contains material that cannot be biodegraded - soil washed out of clothing in the laundry, for example. If solids are not building up gradually in your septic tank, for whatever reason, it is not working properly. A rough rule of thumb is that a properly-sized septic tank needs to be pumped every three to five years. Small families served by a large tank may be able to get by with a longer pumping interval, whereas large families may need to have their tank pumped more frequently.

Septic tanks occasionally suffer an "upset," so that the microbes are destroyed and the wastewater goes untreated. This can happen when a large quantity of a powerful cleaning product (bleach, for example) is flushed into the tank, or when a home is unoccupied for a long period and the tank receives no fresh wastewater. When conditions return to normal, the biological community in the septic tank



re-establishes itself within a few days. There is evidence to suggest that the biological additives can help speed this re-establishment somewhat.

► **What about using one of the biological additives on a regular basis, just to keep the system operating smoothly?** There have been no independent studies to show whether or not additives improve the performance of full-sized septic systems over the long term. If your septic system is not being stressed, it is unlikely that these products offer any benefit to you. The amount of biological material that you would add with each dose of product is tiny compared to the amount of material – enzymes and bacteria – already present and working in your septic tank.

► **How can I keep my system working smoothly and minimize the amount of maintenance it needs?** Here are the pointers you need to follow in your household:

- ◆ Don't put toxic chemicals down the drain. These include solvents, paints, varnishes, waste oil, weed killers, insecticides, and photographic chemicals.
- ◆ Flush strong household cleaning products and disinfectants down the drain slowly, with copious amounts of water.
- ◆ Keep grease and fat out of the kitchen drain.
- ◆ Hold back the inert solids. Cigarette filters, sanitary napkins and tampons, paper towels and facial tissues, condoms, plastic items and kitty litter should go out through the garbage, not the septic system.
- ◆ Conserve water inside the house by repairing leaks as soon as they develop, and cultivating a "water-miser" attitude. Consider replacing old showerheads, faucet aerators,

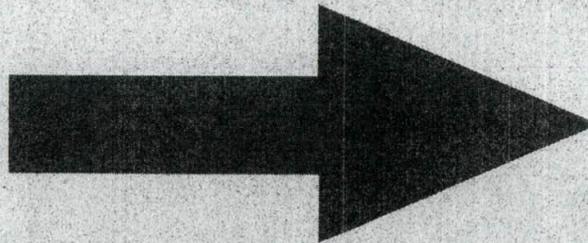
and toilets with new water-efficient models. Insulate the hot-water pipes in your house. All of these measures will save on your energy bills, as well as prolong the life of the septic system.

- ◆ The less you use your garbage disposal, the longer your septic tank can go without pumping.

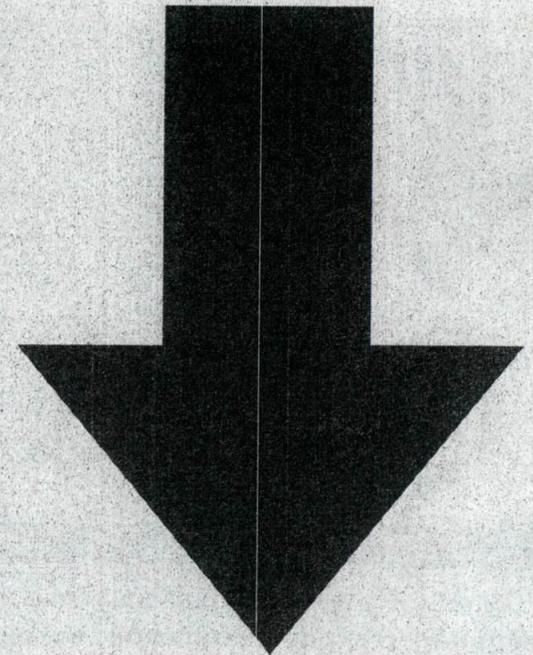
**In closing.....**septic tanks are biological units for the treatment of wastewater. Like all biological systems, they are complex, and susceptible to occasional upset. No one has demonstrated a "magic pill" approach to prevent upset. The best approach to keeping a septic system healthy is to take care what goes down the drain, and not neglect periodic pumping and inspection of the system.

**Additional References:** These publications are free from your County Extension Office:

- Septic System Inspection and Troubleshooting - MontGuide 9403.
- Septic Tank and Drainfield Operation and Maintenance - MontGuide 9401.



Prepared by Gretchen Rupp, PE  
Environmental Engineer/Specialist  
MSU Extension Service – March 1996



## QUESTIONS & ANSWERS



### About Septic System Additives

  
**MONTANA**  
STATE UNIVERSITY  
EXTENSION