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## Solving On-Site Wastewater Treatment System Backups

by Russell Derickson, Extension water and natural resources specialist,  
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Daily household routines can be greatly impacted by on-site wastewater system backups. Heavy rainfall, spring snow melt, or extended rainy periods that result in high water tables can cause backups. Other factors such as lack of system maintenance, changed family size, careless flushing, new water-using devices, inadequate design and sizing, and age of the system all can add to the problem.

Wet conditions can cause on-site systems to backup when the soil treatment field (commonly called drain field) can no longer absorb and treat wastewater. Continued heavy rainfall saturates the soil and raises the water table. If soil treatment fields are underwater, they will not work because there is no place for the effluent to go. This causes the system to backup and results in poor flushing (Figure 1).

Clear water infiltration from foundation drains, sump pumps, leaky tanks, lift stations, and roof drains can overload soil treatment field with water that doesn't need to be treated. Pondered water or surface water flowing over the soil treatment field also causes soil saturation and prevents the treatment field from

working. If the soil treatment field is located in a low spot, backups will occur until the watertable recedes. The solution is to eliminate the excess clear water. Up-gradient diversions, re-landscaping, fixing or installing roof gutters, and rerouting foundation drains and sump pumps away from on-site systems generally will solve clear water infiltration problems.

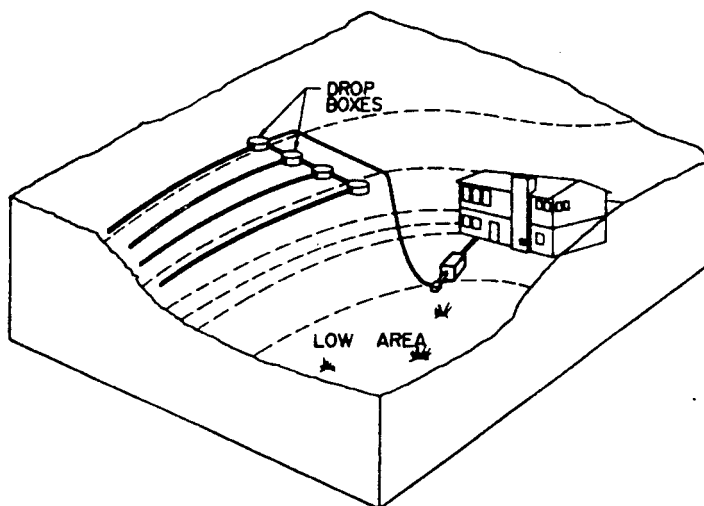
System backups caused by lack of septic tank pumping are harder to fix. These backups occur when solids escape the tank and plug soil pores in the soil treatment field. This in turn reduces the capacity of the treatment field to absorb and move water. Pumping the tank will alleviate the problem for only a few days until the tank refills with wastewater.

*Temporary relief* can be achieved by reducing wastewater flow and changing water use habits. Installing low-flow showerheads and 1.5 gal flush toilets, spreading out washloads over the week, minimizing toilet flushing, and washing only full loads in the dishwasher and clotheswasher will lessen backup problems. Using showers (get wet, lather up, rinse down) instead of baths reduces wastewater flows.

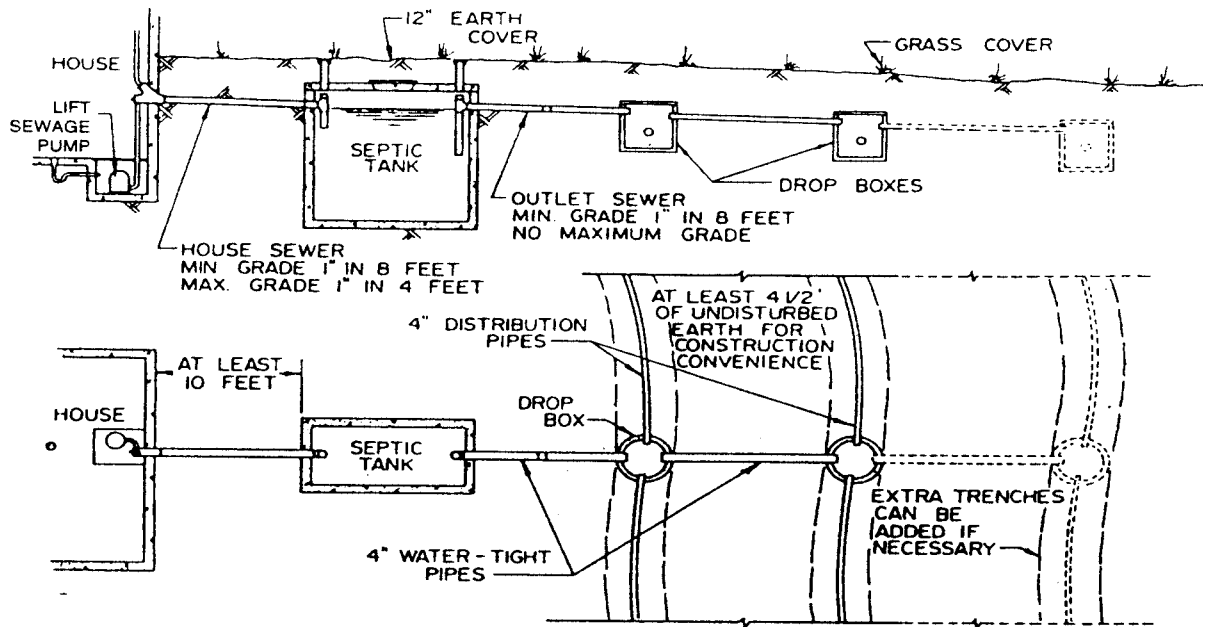
*Long-term relief* comes from enlarging the soil treatment field to spread the wastewater load over a larger area (Figure 2). Expanding existing treatment fields generally will work. Installing a lift station after the septic tank, with a secondary treatment field located away from the original field is another alternative. The best alternative is to install a secondary trench system with a diverter valve. The diverter valve is then turned every other year allowing one of the systems to recover and dry out while the other is in operation.

When adding an absorption area or building a new on-site system, wait until the soil is dry (well below its plastic limit) before beginning construction. July and August usually are the best months. Soil compaction in and around the soil absorption areas can cause new system additions (or new construction) to fail prematurely.

**Figure 1. Pump septic tank effluent to an area with suitable soil.**



**Figure 2. Sewage treatment system with drop boxes to spread the wastewater load over a larger area.**



If your on-site system is experiencing problems and is more than 20 years old, the best advice is to replace the entire system.

Some on-site systems have been functioning for years with no problems even without pumping. They likely have a discharge line emptying into a road ditch, farm drain tile, or grass waterway, as examples. Although it was a common installation practice many years ago, this type of discharge is now a violation of state and federal pollution laws. It is a hazard from both a pollution standpoint and a health standpoint. Diseases like hepatitis and cholera can be transmitted through surfaced-discharged wastewater. Wastewater requires treatment through on-site systems or community treatment systems to prevent pollution and disease risks.

New owners buying an existing home with an on-site wastewater treatment system need to realize the potential for on-site system problems. New owners will have different water use habits than previous owners. Imagine a two-bedroom house built by a semi-retired couple on a small, rural acreage with an on-site system sized accordingly. A middle-aged couple with two teenagers purchases the house. Water use for the new family will at least double that of the previous owners. The on-site system must be able to treat twice as much wastewater or backups will start. Buyers must be aware that an on-site system that "works just fine" for the previous owners may not be adequate for them.

To evaluate your on-site system's performance, obtain a copy of Farm•A•Syst Worksheet 6 or a Home•A•Syst packet from your local county Extension office. These materials include a fact-sheet about proper on-site system management. Completing the worksheet will give you a good estimation of how well your on-site system is being maintained.

To learn more about on-site systems, contact your local county Extension agent, a certified on-site wastewater treatment contractor, or a septic tank pumper. You also can purchase a copy of MWPS-24 "On-site Domestic Sewage Disposal Handbook" (\$6.00), available from the SDSU Agricultural Engineering Dept. Box 2120, Brookings, SD 57007, 605-688-5667.

Ask at your County Extension Office for these publications about on-site wastewater treatment:

- EC 665 Rural Wastewater Treatment for Individual Homes
- ExEx 1018 Septic Tank Maintenance
- ExEx 1032 Wastewater Treatment Systems for Rural Homes and Cabins
- ExEx 1033 Periodic Maintenance for On-site Wastewater Treatment Systems
- ExEx 1035 Septic System Additives

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