



## HOME AND ENVIRONMENT

# What is an on-site sewage (septic) system failure? And what to do about it?

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### Introduction

Properly designed, installed and maintained on-site sewage (septic) systems can provide suitable treatment for wastewater in rural homes and businesses where connection to a wastewater treatment plant is not possible. Functioning on-site sewage systems contribute greatly to an improved quality of life and limit the spread of disease from contaminated water.

According to the Indiana State Department of Health (ISDH), there are about 1 million septic systems in Indiana. The ISDH estimates that approximately 200,000 of these residential wastewater disposal systems are presently inadequate, have failed or are in the process of failing. These failed

systems represent a threat to human health and to environmental quality.

It is important that Hoosiers recognize the signs of on-site sewage system failure. It is vital to the protection of their families and the public as well as the water quality of Indiana and surrounding states. This publication examines the three types of on-site sewage system failure identified by the ISDH. Identifying a failure is important, but only a first step to maintain the quality of our ground and surface water. There are ways to address the problems and correct the deficiency. For more information on how an on-site sewage system works, see HENV-107-W. That publication and HENV-106-W give useful tips for persons who use on-site sewage systems.

In 1978, the ISDH adopted Rule 410 IAC 6-8. This was a first attempt at a uniform minimum standard in the design and installation of on-site sewage systems in Indiana. The ISDH updated the rule as experience showed better ways of dealing with wastewater treatment and new technologies became available to treat wastewater more efficiently. The current rule is Rule 410 IAC 6-8.3, adopted in 2104. For a copy of that document, visit [https://www.in.gov/isdh/files/410\\_IAC\\_6-8\\_3.pdf](https://www.in.gov/isdh/files/410_IAC_6-8_3.pdf). The document spells out current requirements for on-site sewage system construction and repair. Any residence or business that cannot connect to a central sanitary sewerage system must install an on-site sewage system that consists, at a minimum, of a septic tank and a soil absorption field that has not failed. Treatment is required for all wastewater generated in the home or business. This includes for both black water from the toilet and gray water from the laundry, sinks, shower and water treatment. All wastewater generated in the home must go through the on-site sewage system. The exception: Water from water softener recharge. The rule does not permit discharge of water softener recharge on the soil surface, to a field tile or to groundwater. Water softener recharge must pass through a soil absorption field but not necessarily routed through the septic tank.

The rule absolutely does not allow “grandfathering” an on-site sewage system that is in failure. In fact, the rule defines an on-site system in failure as a health hazard. A sewage disposal system that consists of a septic tank and a discharge tile, commonly referred to as a “non-system,” is also not “grandfathered” as it contributes to water pollution and is a health hazard. A “non-system” must be upgraded to include both a septic tank and an absorption field.

A study that examined septic system permits issued by one county in Indiana suggests the updated 1990 version of the rule improved new septic system performance dramatically. The study shows that nearly one in three of all septic systems installed between 1950 and 2001 required repairs, typically within 12 years of installation. However, between 1990 and 2001, less than 3 percent of new on-site sewage systems required repairs, significantly fewer than in previous decades. With further updates to the rule in 2010 and 2014, it appears that less than 1% of new on-site sewage systems will fail within 10 years.

More than half of the occupied homes with on-site sewage systems are more than 30 years old, according to the U.S. Census. Many of the aging on-site sewage systems serving these homes — especially those built

before the 1990 ISDH rule update — report the most problems and failures.

Improved on-site sewage system designs and oversight that is more stringent have resulted in fewer failures. Homeowners may mistakenly believe their septic systems are working properly so long as the toilets flush waste from the home and there is no obvious smell in the yard or adjacent ditches. However, on-site sewage systems fail in other, less obvious ways, so homeowners (especially those with on-site sewage systems built before 1990) should learn to recognize the most common types and causes of septic system failures.

## Types of Failures

Rule 410 IAC 6-8.3 identifies three types of on-site system failure. The concepts of each of these failures are easy to understand but the complexity of the on-site system may make it difficult to conclude whether or not a failure is present. Fortunately, the Indiana Onsite Wastewater Professionals Association (IOWPA) has a list of Certified Inspectors who can help homeowners determine the status of their on-site sewage system, provide information about the condition of components and advise on the need to clean the septic tank and/or repairs needed. Periodic inspection and maintenance can significantly lengthen the life of an on-site system.

### 1. On-Site System Refuses to Accept Wastes and Interferes with Normal Use of Plumbing in the Home

This category of failure occurs when the on-site sewage system rejects sewage until it backs up into a home. Such failures are obvious and typically command a homeowner’s immediate attention. Sewage backflow failures can be extremely hazardous to residents but seldom cause much harm to the environment, if the failure is contained wholly in the home. In most cases, repairs are immediate. There can be a variety of reasons for this failure. The most common reason for a sewage backup into the home is a plugged sewer line leading from the home to the septic tank. Wastewater plumbing fixtures are not trash receptacles. Disposing of objects such as rags, toys, feminine hygiene products, etc., through the toilet can plug the sewer line and cause a sewage backup. Nothing should be disposed of through the toilet other than human excrement, water and toilet paper. Another cause is that the residents have failed to pump sludge from the tank and the tank does not operate

properly because too much of the tank's working capacity is used to store sludge. Sewage backup can occur in newer systems with a clogged outlet filter. Outlet filters have been required on all new septic tanks since 2011, and without regular cleaning and maintenance, the outlet filter becomes clogged and effluent cannot leave the tank at the same rate it enters from the home. Regularly cleaning the outlet filter is necessary. Refer to HENV-105-W for more information. Cleaning the filter is a job best left to professionals.

## **2. Untreated Sewage (Effluent) Seeps to the Surface Above the Soil Absorption Field**

Another category of on-site sewage system failure occurs when partially treated sewage effluent fails to move rapidly enough downward through the soil absorption field and accumulates on the soil surface. A sign of failure is a wet surface and luxurious grass growth above the laterals of the soil absorption field. Partly treated sewage represents a significant health hazard. It contains many harmful pathogens that need further treatment. Pets or people should not walk through this area. Children and pets should not play on an absorption field in failure. Pets are particularly troublesome, as they may run through the effluent and carry the contaminated water on their paws into the home. This type of failure can provide a breeding area for mosquitoes, especially those that transmit diseases such as West Nile virus, Saint Louis encephalitis and others. When it occurs in densely populated neighborhoods, such failures are usually obvious. An individual home site may be more subtle and difficult to detect. This type of failure in Indiana is especially common for systems installed before regulations were in place.

Most Indiana subsoils have clay contents between 30 and 40 percent and are not sufficiently permeable to rapidly take the amount of effluent generated in a home. In addition, many Indiana soils have natural seasonal high water with insufficient depth of aerated soil to complete the treatment process. Many older systems were too small when installed due to lot restrictions and lack of soil knowledge on the site. This kind of failure may also be due to the residents of the home using too much water and stressing the system beyond its hydraulic capacity.

## **3. Untreated Sewage Causes Contamination of a Potable Water Supply, Either Surface or Groundwater**

In this category of failure, untreated effluent passes directly into the environment and contaminates either surface water or groundwater. The "non-systems" referenced above cause this type of contamination. If there is no soil absorption field, the partially treated effluent is discharged directly onto the surface of the ground, into an open waterway or into a field tile system. All of these discharges ultimately end up in a waterway or local groundwater. This type of failure can also occur when partially treated effluent seeps out of a side slope and flows into a ditch or stream. This is obvious in some cases as a black organic stain on the hillside that accumulates over time from organic matter in the effluent. The partially treated effluent may appear "clear" but contains harmful organisms, which carry disease. Partially treated effluent degrades the quality of water in streams and brings excessive nitrogen and phosphorus as well. If the stream is one used for recreation, it may present problems if the water exceeds the US Environmental Protection Agency standards for body contact.

This type of failure can also occur with installation of a soil absorption field on a soil that is coarse sand and gravel. In this case, the partly treated effluent moves so quickly through the coarse soil that it is not treated sufficiently before it reaches the water table. This can contaminate drinking water with harmful pathogens and nitrates. Such failures are not obvious. Homeowners may perceive that their septic systems are working satisfactorily when in fact the systems may be causing considerable contamination that is very difficult to overcome.

Computer modeling and long-term monitoring indicate that failed on-site sewage systems in certain areas will result in environmental degradation. The more dense the failures the more immediate the problem. However, without extensive and long-term monitoring, this is a difficult problem to evaluate, because many on-site sewage system failures are difficult to identify and quantify.

## When a Failure Occurs

If your on-site sewage system needs repair, it is imperative that you contact your local county health department to discuss options to resolve the failure using an environmental health specialist. A list of Indiana health departments is available at <https://www.in.gov/isdh/24822.htm>. Many county health departments can provide a list of professionals who can assist you in identifying the problems and determining possible courses of action. Prior to repairing, replacing, constructing, modifying or altering your on-site sewage system, you must have a written permit from the local county health department. The homeowner is responsible for completing this vital first step.

Repair of an on-site sewage system as well as initial installation requires careful consideration of four specific items.

- Repair plans always begin with soil. A soil evaluation by an Indiana Registered Professional Soil Scientist is the first step. Most county health departments maintain a list of soil scientists who work in the area. A listing of Registered Soil Scientists is on the website for the Indiana Registry of Soil Science, <https://www.oisc.purdue.edu/irss/>.
- Develop, with an expert, a design addressing soil characteristics and limitations of the site. Submit the design to the local health department for review to insure that the design meets the requirements of both the state rule and local ordinances.
- Secure a permit from the local health department for the design developed. Hire a reputable contractor to install the system according to the design and under favorable weather conditions. It is critical to protect the soil absorption field from disturbance, including vehicle traffic and the addition or removal of soil, prior to, during and after installation of the system. Wet soil at time of installation can turn a favorable site into a continuing nightmare because working wet soil can significantly reduce the natural permeability. Soil disturbance can be cause for rejection of a site or can require additional evaluation prior to installing the system. Waiting a few days to dry a site can be time well spent. The Indiana Onsite Wastewater Professionals Association maintains a list of certified installers, as do many local county health departments.
- After installation of the on-site sewage system and approval for use by the local health department, the homeowner should regularly maintain the on-site sewage system. HENV-107-W provides useful suggestions for successful living with an on-site sewage system.