



Septic Systems – What to do after Severe Weather

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The Oklahoma Cooperative Extension Service WE ARE OKLAHOMA

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Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

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- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education

for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.

- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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More than half the houses built in Oklahoma from 2002 to 2017 had septic systems installed (Abit, 2019). Currently, at least 30 percent of houses in the state have septic systems (SORA, 2015). This high percentage is expected because many houses are located in small towns or rural areas outside the service area of centralized wastewater treatment facilities.

Oklahoma is known for severe weather events. On average, counties in the Panhandle experience 11 severe weather events per year that may bring tornadoes, strong winds and/or hail. Counties in the northeastern region of the state may experience as many as 28 severe weather events per year (NOAA, 2013). Most severe weather events in Oklahoma happen in the spring and summer, and many cause flooding and electric power outages. Floods have been recorded in all counties in the state, with most occurring in the northeastern and southeastern regions (FEMA, 2014). Power outages occur year-round, but close to half are weather-related (Eaton, 2015).

This fact sheet focuses on the impact of floods and power outages on the two most common types of septic systems in Oklahoma: 1) conventional or gravity-driven system and 2) aerobic treatment systems/units (ATU). Their design and associated weather-related risks are explained below. Courses of action homeowners with septic systems may take when a flood or power interruption occurs also are provided.

Conventional Septic Systems and Severe Weather Hazards

Conventional systems consist of a septic tank and lateral lines that deliver partially treated effluent to the soil treatment area (STA) for final treatment of the wastewater (Figure 1). Because gravity drives water through this system, it does not require electricity and is not affected by power outages. However, flooding of the area above the septic tank and/or STA can lead to serious problems. If the lids of the septic tank are not watertight, water can enter the tank. Secondly, if the STA is flooded for an extended time, rainwater may percolate through the backfill, fully saturating the gravel layer in the trenches and eventually causing water to backflow into the septic tank. In either case, the septic tank could fill up, resulting in two possible scenarios: 1) sinks and toilets no longer drain and/or 2) untreated water from the tank back-flows to the house.

ATUs and Severe Weather Hazards

The ATU treatment train consists of a septic tank (or trash tank), an aeration tank and clarifier (Figure 2). This system requires electricity to operate the aerator, which supplies air to the aeration chamber and the pump that disposes the treated effluent to the dispersal area. Without electricity, household

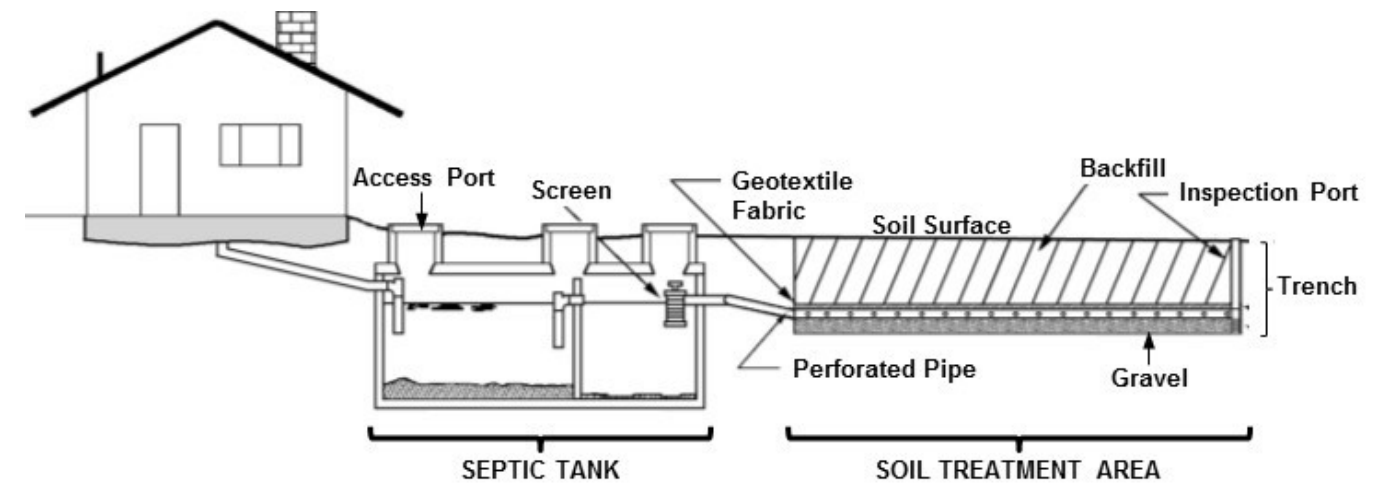


Figure 1. Schematic illustration of a conventional septic system.

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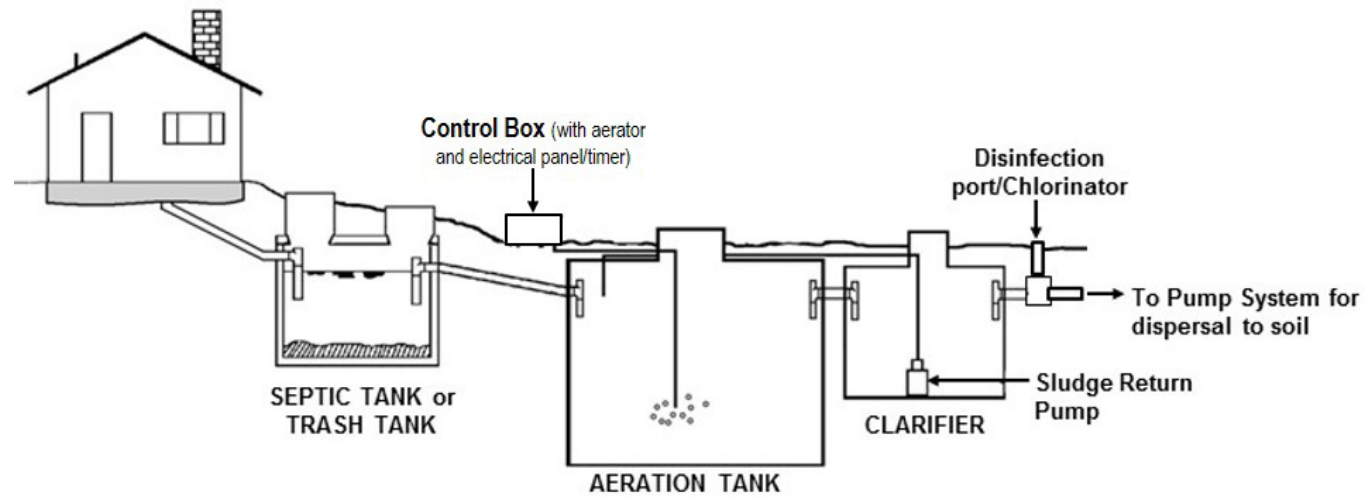


Figure 2: Schematic illustration of an aerobic treatment system.

wastewater will not be treated and continued water use will keep filling the tanks. Prolonged power outage (i.e., three or more days) may result in strong, foul odor from the tanks, and sinks and toilets no longer draining.

If severe weather results in flooding, the ATU needs to be turned off. The aerator (or air pump) and the electronic panel/timer are usually housed in a control box on the land surface just above the aeration tank. These components run on electricity and could malfunction when flooded. In addition, floodwater may enter the tank if the lids are not watertight. Continuing to run the system may have unintended consequences: final soil treatment of the effluent cannot occur in a flooded dispersal area and will only result in environmental pollution.

What to do when any septic system is flooded

1. **Plug or seal all drains in the basement.** This will prevent sewage from the septic tank backing up into the house.
2. **If you have an ATU and there is a high likelihood that the control box will be submerged during a flood event, turn the system off.** Recall that the aerator and the electrical panel in the control box are powered by electricity, and both could short-circuit if powered when they are flooded.
3. **Use as little water as possible.** You do not know how long the flooding will last. When it floods, there is a risk that sewage will back up into the house. The simplest way to reduce this risk is to relieve pressure on the system by using less water.
4. **If sinks drain slower than normal, immediately stop water use because it could be a sign that water is backing-up from the tank to the house.**

What to do when the floodwaters recede

1. **Continue to minimize water use** (assuming there is no backflow). The surface may no longer be flooded, but the septic tank and the trenches of conventional systems may still be filled with water. It is prudent to continue to minimize water use until the system is inspected and/or repaired by a professional.

2. **Clean and disinfect areas in the house affected by backflow.** This has to be done with care because wastewater from the septic tank contains harmful microorganisms and dissolved substances. To be safe, use the services of professional cleaners.
3. **Visually inspect the various components of the system.** Take note of any signs of water leaking into the tanks, eroded areas, accumulation of sediments in the control box, strong foul odor and rusted electrical components. Results of a visual inspection will be helpful when calling a professional service provider. They will usually ask for information that will help them understand the extent of the problem.
4. **Have a professional service provider inspect the ATU before it is turned on.** Electrical components will most likely need repair or replacement. Only trained specialists should clean or repair septic tanks due to harmful substances and dangerous gases. Contact the local Department of Environmental Quality (DEQ) office (<http://deq.state.ok.us/ECLSNNew/localOffices.htm>) for a list of septic system service providers in your area.
5. **Do not drink well water until test results come back safe.** Access the DEQ Laboratory Facility Search page (<https://labaccreditation.deq.ok.gov/labaccreditation/>) for a list of accredited labs in your area.

What to do in a power outage

1. **Use as little water as possible.** You'll never know how long the power outage is going to last. Without electricity, wastewater will stay in the ATU tank and continued use will cause untreated water to back up to the house. If the power outage lasts for more than three days, water should no longer be disposed down the drain. If available, use a backup electricity generator to power the system.
2. **If the power comes back after a few hours, check if the system is running.** This is done by simply listening if the aerator is giving off a humming sound. When applicable, set the dispersal timer to the desired schedule.

3. **After a long power outage (i.e., more than three days), continue to minimize water use for the next three days.** The ATU treats water using the aerobic bacterial community in the aeration chamber. Their numbers significantly decrease under anaerobic conditions, resulting from a prolonged power outage. It will take a couple of days for the bacterial community to recover to a level that effectively treats wastewater.

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