



Assessing Your Petroleum Product Storage

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The goal of this *Farm•A•Syst* factsheet is to help you protect and improve the groundwater that supplies your drinking water as well as the ponds, lakes, rivers, and streams that make Tennessee beautiful.

The following questions are designed to help you pinpoint potential problem areas on your farmstead. These problem areas may contribute to the contamination of your drinking water if they are not managed properly.

If your answer to any of these questions is **YES**, or if you don't know the answer, you may have a high-risk situation in your home or on your farmstead. Refer to the fact section with the same number as that question (under the heading, "What you should know about . . .") for more information.

Don't be alarmed if your answer is **YES** to many or even all of these questions. That does not automatically mean you have a water-quality problem. It may,

YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	1. Is your petroleum storage tank at grade with or upslope from your well, or less than 100 feet from your well?
<input type="checkbox"/>	<input type="checkbox"/>	2. Is it located within 50 feet of buildings or other combustible objects?
<input type="checkbox"/>	<input type="checkbox"/>	3. Is it located in corrosive or acidic soils, or in sandy or coarse-textured soils?
<input type="checkbox"/>	<input type="checkbox"/>	4. Do you have a bare steel tank over 15 years old?
<input type="checkbox"/>	<input type="checkbox"/>	5. Does your tank have <i>no</i> spill or overflow protection?
<input type="checkbox"/>	<input type="checkbox"/>	6. Do the pipes show rust or damage, or do they slope away from the tank?
<input type="checkbox"/>	<input type="checkbox"/>	7. Was the tank installed without backfill, anchors, or other prescribed protections, or was it installed by someone who was untrained?
<input type="checkbox"/>	<input type="checkbox"/>	8. Do you <i>never</i> monitor your fuel use or test the tank for leaks?
<input type="checkbox"/>	<input type="checkbox"/>	9. If your tank is aboveground, does it lack an enclosure such as a fence with a lock?
<input type="checkbox"/>	<input type="checkbox"/>	10. Do you have any unused underground tanks on your property?

however, tell you that change is needed to avoid potential problems. In the same way, answering *NO* to every question does not mean you are *not* at risk.

Why should you care?

Groundwater is the underground water that supplies wells and springs and recharges surface water bodies. It is the source of drinking water for many Tennesseans. Up to 20 million gallons of groundwater may be stored under the typical farmstead—stored within 100 feet below fertilizer and pesticide storage areas, fuel tanks, livestock pens, and septic systems, all potentially major sources of pollution. The management decisions you make on your farmstead can significantly affect the quality of your drinking water and your family's health. These decisions can also affect your potential legal liability and the value of your property.

Surface water includes bodies such as ponds, lakes, rivers, and streams. Besides their aesthetic and recreational value, they are often an important source of drinking water for livestock.

Aboveground and underground storage of fuel presents a threat to public health and the environment. Petroleum contains many toxic compounds. Tanks that leak or spill allow these compounds to reach the soil and the groundwater that supplies your well. Low levels of fuel contamination in water, while hazardous to your health, cannot be detected by smell or by taste. Water that seems fine may in fact be dangerous to drink.

Even a small gasoline leak of one drop per second can result in the release of about 400 gallons of gasoline into the groundwater in a year. As little as one gallon of gasoline spilled can contaminate *two to ten million gallons* of the groundwater that supplies drinking-water wells. A few quarts of gasoline in the groundwater may be enough to pollute a farmstead's drinking water severely.

According to the U.S. Environmental Protection Agency, nearly one out of every four underground storage tanks in the United States may now be leaking. If an underground petroleum tank is more than 15 years old, especially if it's not protected against corrosion, the potential for leaking increases dramatically. Newer tanks and piping can also leak if they aren't installed properly. Aboveground tanks, while they may seem

safer, can also pollute groundwater through leaks, spills, or corrosion.

Preventing tank spills and leaks is especially important because gasoline, diesel fuel, and fuel oil can move rapidly through the soil into groundwater. Also, vapors from an underground leak can collect in basements, **sumps** (drainage pits), or other underground structures and explode.

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What you should know about . . .

1. Tank location relative to your well

The most important consideration in locating your liquid-petroleum storage tank is its distance from your drinking-water well. Keep storage tanks and fuel-filling areas at least 100 feet from any well to avoid contamination. Also, tanks and filling areas should be downslope from the well if possible so that spills will flow away from the well. If the groundwater that your well taps is shallow, it is likely that the groundwater and any contaminants in it run downhill.

2. Tank location relative to buildings

To safeguard against explosion and fire, tanks should be more than 50 feet from buildings and other combustible objects. Be sure to allow adequate access for emergency vehicles.

3. Soil type

The type of soil your tank is located in greatly influences the likelihood of groundwater contamination. Soil affects not only the rate of **corrosion** (rust) of your tank, but also the rate at which leaking or spilled fuel seeps down to groundwater. The soil also must be able to support your aboveground tank and allow it to be properly anchored.

Highly corrosive clays, wet soils, and **acidic** (low pH) soils can speed up the rate of corrosion of underground metal tanks and piping. Corroded tanks and pipes leak fuels directly into the soil.

Even though diesel fuel and fuel oil are more dense than gasoline and move more slowly through the soil, they can eventually reach groundwater. How quickly this happens depends on the permeability of the soil. The more porous the soil (coarse-textured soils such as sand or gravel are highly porous), the faster the rate of downward movement to groundwater. Your tank is better located in medium- or fine-textured soils such as clays or loams.

4. Type and age of tank

If a tank is not constructed of or covered with nonmetallic materials, the possibility of corrosion exists. A bare steel tank will eventually corrode—and the older your tank, the more likely it is that corrosion has already occurred.

All new underground storage tanks and related piping must either be constructed of nonmetallic materials like fiberglass or have some type of corrosion protection, such as an interior liner. All aboveground tanks should be elevated at least one foot off the ground, since direct contact with the soil increases the rate of corrosion.

5. Spill and overfill protection

Spill and overfill protection are also required for all new tanks. Spill protection for underground tanks generally consists of a catch basin around the tank, preferably constructed of an **impermeable** (waterproof) material. Aboveground tanks should be placed within a concrete or soil dike with a catch pad able to hold 125% of the tank's capacity.

Overfill protection is usually either a warning buzzer or an automatic shutoff of the pump triggered by the level of fuel in the tank being filled.

6. Pipes

EPA studies show that piping failures cause most petroleum leaks from underground tanks.

Metallic piping should be protected from rust by **galvanization** (coating iron or steel with zinc) or by **cathodic protection** (attaching a metal piece—usually zinc or magnesium—to the pipe, which prevents corrosion by reversing the electric current that causes it). New pipes should be constructed of fiberglass or another nonmetallic material. If rust is showing on your pipes, fuel may already be leaking into the ground.

The **check valve** (a device placed between the tank and the pump to prevent the backflow of petroleum into the tank from the *pipes*, which can cause fuel

contamination) should be located immediately before the pump, not at the foot of the tank. Piping should slope back toward the tank so that fuel will drain back to the tank, decreasing the amount of petroleum left sitting in the pipe after use. This reduces the risk that petroleum will leak through rusted pipes into groundwater.

7. Tank installation

When a tank is installed, the manufacturer's recommended practices should be followed closely to minimize the leaking potential of the tank and its piping system. Tennessee law requires that the tank must have spill and overfill protection, corrosion protection, and a method of leak detection. Installation should be performed only by a certified installer. Even scratches in a metal tank caused by careless installation can speed up the corrosion and eventual deterioration of the tank.

8. Tank testing and leak detection

Regulations for new underground tanks require that all tanks have a method of detecting leaks. If you already have a tank on your farm, especially if it is more than 15 years old, you need to establish some sort of leak-detection method and use it regularly. Cleanup of gasoline leaks is always expensive and often ineffective. It is best to catch leaks while they are still minor.

A list of approved tank-testing methods and suppliers' phone numbers is available from the Tennessee Division of Underground Storage Tanks (TDUST). Even if your tank has already been tested and proven tight, you should install an internal or external monitoring method such as a groundwater monitoring well, vapor monitor, or automatic tank gauge.

Measuring tank inventory is an inexpensive and easy way to help detect leaks. Any unexplained decrease in the fuel level in the tank indicates a leak. This method won't detect very small leaks, but it can alert you to potential problems quickly.

If you find a leak or spill which exceeds 25 gallons (except spills caught in the confinement basin of an aboveground tank), state law requires you to report it to the Tennessee Emergency Management Agency (TEMA) at (800)262-3300.

9. Aboveground tank enclosure

Aboveground tanks should be surrounded by a locked metal fence, preferably no shorter than six feet. This prevents unauthorized access and collisions with farm vehicles.

10. Unused underground tanks

Unused underground tanks can cause problems as long as they remain in the ground. First, any metal already in the ground increases the corrosion rate for new tanks placed there. In other words, your old tank can interfere with your new tank's resistance to corrosion. Unused tanks can also continue to corrode. If they contain gas or oil, they can be a safety hazard and a threat to groundwater.














If you suspect that your unused underground tank is leaking, consult an authority. For commercial tanks, report a possible spill to TDUST at (615)532-0945. For private tanks with a capacity of less than 1100 gallons, call the Tennessee Department of Conservation, Division of Solid Waste, at (615)532-0780. If there is groundwater pollution in your area, your neighbors may point to your tank as the cause. Document the steps you take to remedy the situation so that if groundwater problems occur, you will be protected from legal action.

Unused tanks should be removed from the ground. Notify the local fire department at least one month before you have a tank pulled, so that precautions can be taken to prevent an explosion or other problem. Lives have been lost because of the improper removal of underground tanks. Dispose of pulled tanks at a landfill or take them to a scrap dealer.

If you can't remove the tank from the ground, it should be filled with an **inert** material (one that doesn't tend to react with other substances), such as sand. In either case, the site should be checked for signs of tank leakage: odors, soil stains, or visible pools of petroleum.

Unused aboveground tanks should be emptied, marked as not to be used, and protected from being refilled by covering the fill ports (when the fill ports are plugged or capped, one plug should have an eighth-inch vat hole to prevent pressure buildup in the tank caused by changes in temperature. If you don't dispose of these tanks away from the farm, store them so that water does not get inside.

Remember:

-  Locate your tank at least 100 feet from your drinking water well, downslope, in soils with as low permeability as possible.
-  Make sure the tank is more than 50 feet away from buildings.
-  Be sure that your tank is installed and anchored properly by a certified installer, and that pipes cannot twist or break if the tank is disturbed.
-  Determine whether the location of the tank will cause it to block movement of farm vehicles during refueling or make maintenance work on the tank difficult. Protect your piping from collisions with farm and fuel vehicles.
-  Use an aboveground tank instead of an underground tank if your farm is in a low-lying area or an area with a shallow water table.
-  Register all underground tanks of 1100 gallons or more with TDUST at (615)532-0945.
-  Install spill and overfill protection on new underground tanks; old tanks must have this protection by December 22, 1998.
-  Construct a soil dike and pad under aboveground tanks to contain spills and leaks.
-  When rainwater gets in the catch basin, skim off any spilled fuel before dumping the water, and recycle or burn it.
-  Test the tank regularly for leaks, and measure the tank inventory every month.
-  Report spills of more than 25 gallons to TEMA. Registered tanks can qualify for spill cleanup reimbursement from the Petroleum Storage Tank Trust Fund.
-  Have unused tanks pulled or filled by a certified installer.
-  Assess your home heating-oil tank as well. These tanks are exempt from most federal tank requirements, but they carry the same risks of liability. Liquid-propane tanks, on the other hand, do not threaten groundwater because the gas vaporizes quickly.

If you want more information . . .

Contact:

- Your county Extension office
- Tennessee Department of Environment and Conservation
Division of Underground Storage Tanks
401 Church Street
L&C Tower, 4th Floor
Nashville, TN 37243-1541
(615)532-0945

Division of Solid Waste
401 Church Street
L&C Tower, 5th Floor
Nashville, TN 37243-1535
(615)532-0780
- Tennessee Emergency Management Agency (TEMA)
(800)262-3300
- Your local fire department
- A certified tank installer

Read:

Musts for USTs: A Summary of New Regulations for UST Systems. U.S. Environmental Protection Agency, 1988.

Dollars and Sense: A Summary of Financial Responsibility for UST Systems. U.S. Environmental Protection Agency, 1988.

These publications are available from the U.S. Environmental Protection Agency at

401 M Street SW
Washington, DC 20460

Download:

These sites on the World Wide Web (WWW) are good places to start when browsing the Internet for information about water quality:

- <http://funnelweb.utcc.utk.edu/~utext>
(University of Tennessee Agricultural Extension Service)
- <http://www.epa.gov>
(U.S. Environmental Protection Agency)

- <http://www.usda.gov>
(U.S. Department of Agriculture)
- <http://h2o.usgs.gov>
(U.S. Geological Survey)
- <http://www.dtnsh.er.usgs.gov>
(Tennessee division of USGS)
- <http://hermes.ecn.purdue.edu:8001/server/water/water.html>
(National Extension Water Quality Database Website, Purdue University)

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