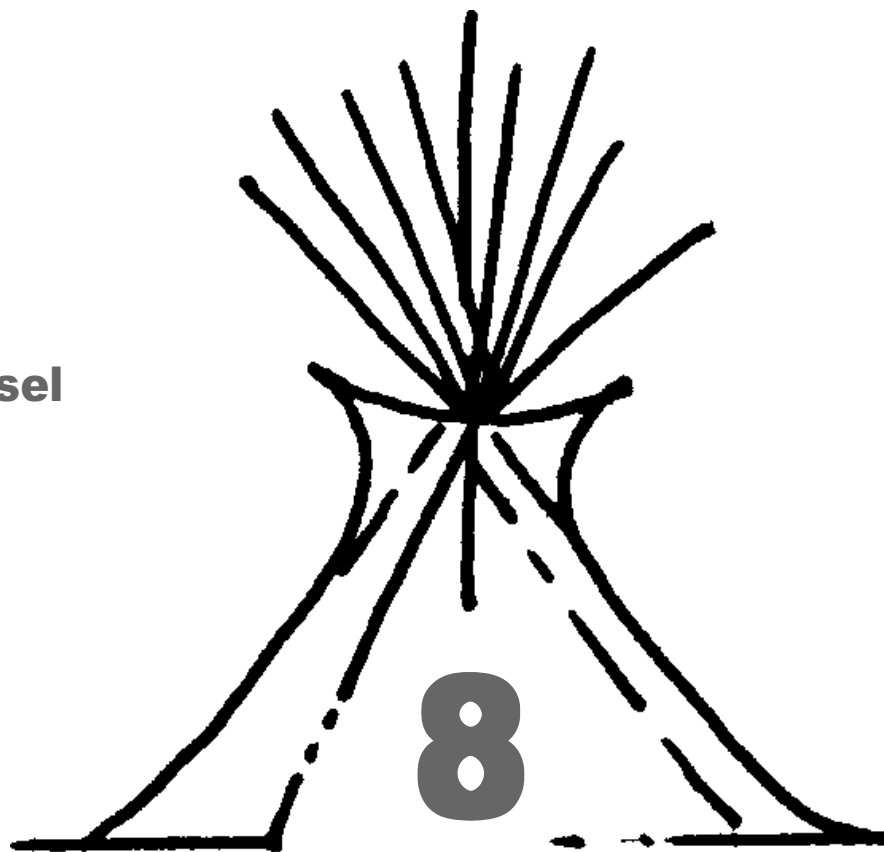


FUELS

Safely Using Gasoline, Heating Oil, Diesel and Other Fuels



Fuels we use in vehicles, machines and home heating can affect the health of your family and the environment.

This fact sheet talks about how to reduce your risks when using gas, heating oil, diesel and other fuels.

1. Fuel Containers

Fuel stored in portable containers and the gas tanks of gas-powered machines may endanger groundwater and surface water. This part applies to anyone who owns or uses a:

- lawn mower
- chain saw
- leaf blower or snow blower
- weed trimmer
- auxiliary generator
- kerosene heater
- snowmobile
- camp stove
- motorboat
- car or truck

2. Fuel Tanks

This part is for homeowners with aboveground, underground, or basement fuel tanks on their property (whether they are in use or not). It tells about:*

- tank location
- tank care
- tank removal and abandonment

** Applies to tanks that hold less than 1,100 gallons. Larger tanks or those used for business purposes may be subject to greater regulation. This chapter does not cover the storage of liquefied gases, such as liquid propane (LP) and liquid natural gas.*

Connected to the Earth

There can be no progress in environmental law without some insights into the sacredness of the land.

—Vine Deloria, Jr., Standing Rock Sioux

How fuels can harm your health and the environment

You may not have thought much about how you store gasoline, heating oil and other fuels. Most people own at least one fuel-burning device, like a lawnmower, and keep fuel in portable containers that holds 1 to 5 gallons. You may also store heating fuel of gas for your car in a storage tank.

Fuels are hazardous. If you are not careful about how you use them and store them, they can pollute the water you drink and the air you breathe. It is very important to prevent spills and leaks. Even as little as *1 gallon* of gasoline can make groundwater unsafe to drink. Petroleum products contain many toxic compounds, including benzene, which is known to cause cancer.

You can't depend on taste or smell to tell you there is fuel in your drinking water. Contamination can come

from unexpected sources. Unknown or forgotten underground tanks have come back to haunt property owners. Contaminated soil and water can ruin your property value and you may be held responsible environmental damage and costly cleanups. Vapors from fuel can also start fires or collect underground and explode.

Large tanks of fuel pose a higher risk of contaminating groundwater than the small amount we store for lawnmowers and similar equipment, but any amount of fuel increases the environmental risks around your home.

Protect the health of your family, your community and the environment by storing fuels carefully. You'll also be safeguarding your biggest investment—your home.

This fact sheet can help you identify areas of risk, and plan to reduce or eliminate potential problems.

PART 1 • Fuel Containers

How much fuel do you buy and use?

It is best to buy and store as little fuel as possible for short periods. This means (1) buying in small quantities and (2) buying no more than you need for a month or so of mowing the lawn or blowing snow.

If you have more than a gallon of leftover fuel at the end of a season, buy less next time. Try to use up leftovers. You can pour extra gasoline into your car's gas tank: Diluting one part old gas with five parts new gas will protect your engine. Or give leftover gasoline to a neighbor to use (figure 8.1). Beware: Oil-blended fuels should be used only in engines designed for them.



Figure 8.1 If you have leftover fuel at the end of lawn mowing season, a neighbor may be able to use it up.

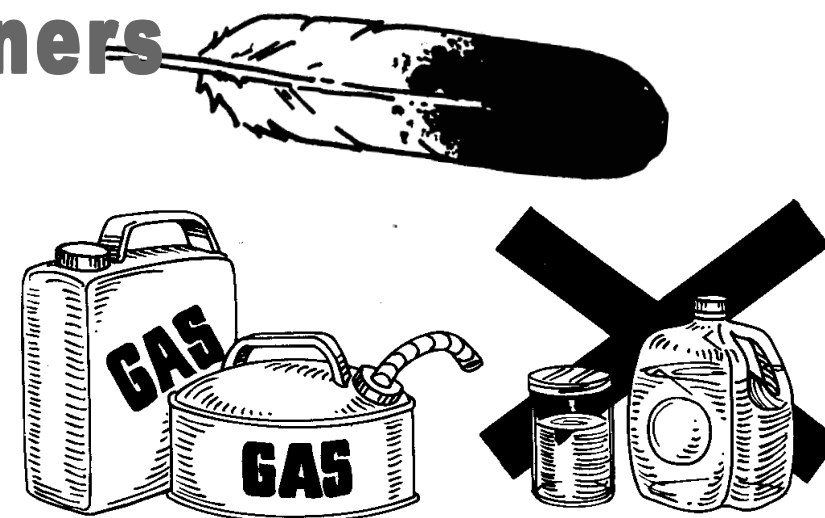


Figure 8.2 Use only UL-approved or original sale containers to store fuel. Storing fuel in an unapproved container, such as a glass jar or plastic jug, is dangerous.

Use approved containers

It is important to store fuel only in safe, approved containers or the original containers they were sold in (figure 8.2). You can buy UL-approved containers (red for gasoline, blue for kerosene, and yellow for diesel) at your local hardware store. The container should be clearly labeled to identify its contents and fitted with a spout or other device to allow pouring without spilling.

Storing fuels in an uncovered or unapproved container is dangerous. For extra spill protection, keep fuel containers inside a bucket or other container that can prevent leaks from spreading.

Store in a safe, well-ventilated place

To avoid fuel vapors—which are a health hazard and fire danger—keep fuel containers and fuel-powered devices in a se-



cure, well-ventilated place with a paved floor. It is safer to store fuels in a shed or unattached garage, not in your basement or a garage attached to your home (figure 8.3). Keep containers off the floor. Keep them out of the reach of children, and make sure the lids are tight to prevent easy access.

Check your fuel containers and machinery regularly

From time to time, check storage containers and fuel-driven devices for leaks, especially if they haven't been used for some time. Small leaks can add up over time. Keep on top of things through regular inspections and maintenance. Always recycle or safely dispose of engine maintenance products. (Fact sheet 5, "Hazardous Household Products," has more information on disposal and recycling.)

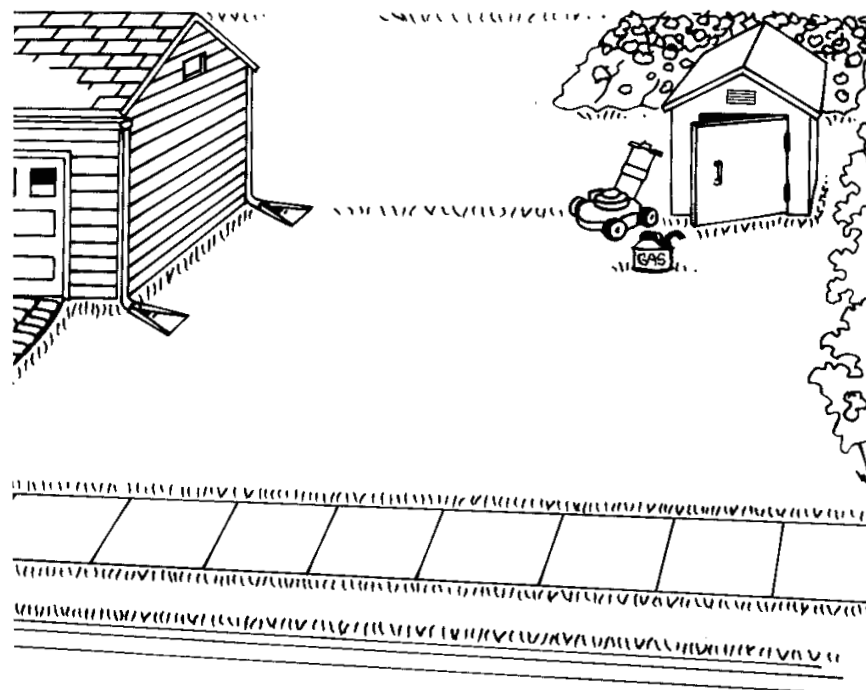


Figure 8.3 Storing fuel in an unattached shed or garage is safer than storing it in an attached garage or basement.

Do Table 1 - Fuel containers

Check all the places where you store fuels—garage, basement, or shed—and check how the fuels are stored. Use the table below to mark the risk level that fits your situation best.

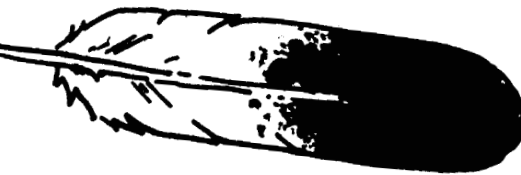
Responding to risks

Try to lower your risks. Transfer any medium- and high- risks you found in table 1 to the action checklist on the last page of this fact sheet. Then plan actions to reduce your risks. If you need more information, contact local fire officials.

Table 1 - Fuel Containers

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Quantities stored	Moderate amounts of fuel are purchased. Fuel is stored for less than six months.	Fuel is stored more than six months before use.	Excess quantities of fuel are purchased. Fuel is stored more than 12 months.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Container safety	Fuel is stored in a UL-approved or original sale container.	Fuel is stored in a UL-approved or original sale container with signs of age or damage.	Fuel is stored in a non-approved container (for example, a glass jar or open container).	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Storage location	Fuel is stored in a well-ventilated, unattached garage or shed away from the house. Concrete floor is best.	Fuel is stored in a garage attached to the house. The area is poorly ventilated.	Fuel is stored inside the home or in the basement. Dirt floor is least safe.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
and disposal	Fuel is used up in devices, so disposal is unnecessary.	Fuel is stored on-site indefinitely or until evaporated.	Fuel is poured down a house drain storm drain, poured on the ground, or sent to a landfill.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Leak detection	Storage containers and fuel-driven devices are examined often for leaks.	Storage containers and fuel-driven devices are sometimes examined for leaks.	Storage containers and fuel-driven devices are never examined for leaks.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

PART 2 • Fuel Tanks



Risks you should know about

It is very important to know about fuel storage tanks on your property—including tanks you use and any that are abandoned. As a tank owner, you are responsible to keep up with strict laws. Your state may require you to register storage tanks with government authorities and certain tanks may be illegal for home use.

You are financially responsible for leaks from any tank on your property, **even if you don't know the tank is there!** Homeowner's insurance **does not** usually cover the costly cleanup of fuel spills. Contact state or tribal environmental and health officials to learn more about your legal responsibilities.

The next three parts are: *Tank Location*, *Tank Care*, and *Tank Removal and Abandoned Tanks*.

Before reading *Tank Care*, you may want to gather some basic information. How many tanks do you have? Where are they located? Using records or your memory, consider the history of each tank separately. When was it installed? Has it been serviced or inspected? Unless you are sure you have no unused underground tanks, it is best to check for them.

Part 2a—Tank location

This part covers aboveground and underground tanks but not basement storage tanks. In table 2a, answer only those questions that apply to you. Remember to assess each tank separately.

Distance to wells and surface waters

Fifty feet is the minimum distance that should be between a fuel tank and nearby wells, but the more distance the better. Other things can affect risks related to distance. Tanks are safer when they are downhill from wells. Some soil types (such as sandy ones) allow pollutants to seep through more quickly.

The 50-foot minimum also applies to the distance between fuel tank and streams, wetlands, ponds, and other surface water. Some states and communities require greater distances. Check with local officials in your area.

If your tank is in a high-risk location, consider having a professional remove it or move it as far as possible from wells and surface water. If it must be near a well or surface water, aboveground tanks with secondary containment are better. *Never try to convert an underground tank into an aboveground tank or vice versa.* For professional help, look in the yellow pages under tank, environmental, petroleum, or excavating. If you can't remove high-risk tanks, be extra careful to monitor them for spills and leaks.

Distance to the water table

In most places, if you dig straight down, you will eventually reach water. This "water table" may be a few feet to hundreds of feet down. The distance to the water table is important for several reasons.

When water is close to the surface, it's more likely to contact the steel walls of a tank. In wet conditions, metal is more likely to corrode. Some types of soil, especially clay, may promote rust.

Spills reach groundwater more quickly if the water table is close to the surface or during times of flooding. Agencies like Tribal Water Quality, the Environmental Quality Department, the state Geological Survey, the Natural Resources Conservation Service or professionals such as well drillers can help you find out about your water table.

If you don't know how deep your underground tank is buried, you should assume it is no more than 10 feet. Consider having each high-risk tank professionally relocated or removed. The cost of moving it may be far less than paying for cleanup in the future.

Table 2a—Tank Location

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Distance from your water well.	The tank is greater than 100 feet from a water well.	The tank is between 50 and 100 feet from a water well.	The tank is less than 50 feet from a water well.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Distance from surface water	The tank is greater than 100 feet from a wetland, stream, river, pond, or lake.	The tank is between 50 and 100 feet from a wetland, stream, river, pond, or lake.	The tank is less than 50 feet from a wetland, stream, river, pond, or lake.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Water table	The water table (distance to ground water) is consistently more than 10 feet below the surface.	The water table is consistently between 5 and 10 feet below the surface.	The water table is consistently 5 feet or less below the surface.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High



Do Table 2a - Tank Location

Take a look at your tank location using the table on the previous page. Mark the risk level that fits your situation best.

Responding to risks

If you find any medium or high-risk practices as you complete the table, record them in the action checklist at the back of this fact sheet. Then work on reducing your risks.

Part 2b - Tank care

Aboveground, underground and basement tanks

Risks of Underground Tanks

The biggest risk with underground tanks is that they are old or leaky. Tanks over 15 years old have a much higher chance of leaking. But even newer tanks and piping can leak, especially if they were incorrectly installed.

Most older tanks don't have corrosion protection to prevent leaks, so they are at high risk. It's expensive to put corrosion protection on existing tanks, so it may be cheaper in the long run to replace them.

New underground tanks should (and in many states must) have corrosion protection: such as an interior tank liner, a protective coating on the outside of the tank, or cathodic (electric-chemical) protection. Fiberglass tanks don't corrode, but they can have other problems, such as puncture holes.

Check the tank's pipes and hoses.

The pipes, hoses, valves, and fittings connected to a storage tank can be a major source of leaks. They are often overlooked, especially if they're underground. Here, too, age is a factor. Pipes fail because of corrosion, accidents, and weather-related things like frost heaving. Avoid problems by having pipes professionally installed and regularly inspected.

Finding leaks

Leak detection is tricky for underground storage tanks, but it's extremely important for tanks more than 15 years old. Set up a schedule to regularly inspect all tanks for leaks and damage, including heating oil tanks in your basement.

One way to find leaks is called "tank and pipe testing" or "tightness testing." This involves putting the tank, piping, and contents under pressure and checking for leaks. Many tank owners choose to have their underground tanks removed rather than pay for costly testing.

WHO ARE YOU GOING TO CALL?

For more information on leak detection and for names of approved tank-testing methods and suppliers, contact local or state officials or a representative from a fuel marketing association.

Keep track of fuel levels

A less expensive way to check for leaks is to monitor the level of fuel. Measure precisely and record the amount of fuel in the tank each month. Then compare your records to the amount of fuel delivered and used. If you notice a difference in your records, it may indicate a leak. This method is not always accurate, and you may miss small leaks. Underground tanks for heating fuel dispense it automatically as it is needed, so it is best to monitor for changes over the summer. If you suspect a problem, contact your local fuel supplier.

Signs of trouble

Use your senses: *Your eyes, ears and nose can detect leaks.*

- Is there an unexplained oil-like substance on streams or wet places near the tank?
- Is nearby soil stained with petroleum?
- Is there a strong, constant smell of petroleum near the tank?
- Have you or your neighbors smelled fuel odors near plumbing or sewer line openings or in basements?
- Is there a petroleum taste or smell in your drinking water?
- Normally, if your tank is above ground you can see leaks, but be aware of leaks in areas you cannot easily see, such as where the tank touches the ground.

Be aware of mechanical changes: Take notice of unusual or changing operating conditions at the pump.

- Does your suction pump rattle
- Does fuel flow unevenly?
- Does the pump hesitate too long before dispensing?

These may be signs of leaks or damage to the piping.

Preventing spills is important!

Overfilling is most the common—and most avoidable—cause of spills. Never walk away while filling a vehicle with fuel. Watching fuel transfers closely is one of the best ways to protect against spills. Don't rely on automatic shutoff devices. They can prevent spills but are not suitable for every tank. Install a vent whistle or fill-level indicator to prevent overfilling basement (home heating fuel) tanks. Ask a tank or fuel supplier about these devices.

Box-like containment structures are available to prevent any leaks or spills from aboveground tank from spreading. Even if the entire contents of a tank leak out, a well-designed containment system should keep the fuel and any water that has accumulated from escaping. You can construct a concrete dike and pad, or buy a special structure made for that purpose. Many states require them.

Protect your fuel from theft

Protecting your gasoline and diesel pumps against theft lowers pollution risks. Someone attempting to steal fuel can damage your tank or spill fuel. The simplest form of security is to lock your pump. Enclosing an aboveground tank within a 6-foot locked fence is even more secure.



Protect tanks from accidents and damage

Aboveground tanks can leak if they are not well-supported and protected. They may be damaged by vehicles and other objects, or by changes in soil moisture and frost heaving. Tanks should be on a solid base or on stable footings made of brick, cinder block, or concrete. Do not store anything around or under a heating oil tank in your basement. Heavy objects can damage its pipes. If your tank is in a garage or outdoors, protect it from vehicles by putting posts or some other barrier around it.

Do Table 2b - Tank care

Fill out the table below. For the questions in the left hand column that apply to you, mark the risk level in the right-hand column that fits your situation best.

Responding to risks

Transfer any medium and high risks from the table to the action checklist at the end of this fact sheet. Then plan actions to reduce your risks.

Part 2c - Tank removal and abandoned tanks

Unused tanks may pose potential risks to health, the environment and property value, or you may be responsible for a costly environmental cleanup (figure 8.4). Sometimes old pumps or fill pipes will lead to forgotten tanks. Former owners of the property, neighbors, or local fuel suppliers may be able to help.

Abandoned tanks

Inactive tanks are an environmental threat until they are removed. Emptying and filling them with inert material like sand or soil is one solution, but it may not be permitted in your area.

The best environmental and legal protection is to have the tank removed and the soil and groundwater checked for contamination. Your local fire marshal can tell you the best way to go about it.

You may need a permit to remove a tank or be required to hire a certified professional. Even if you are legally allowed to remove your own tank, it is better to hire a professional. This is a dangerous job that kills or injures nonexperts every year. Contractors can help you dispose of the tank at a landfill or with a scrap dealer.

Table 2b - Tank Care

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Age of your underground tank (gasoline, diesel, or heating oil)	Metal underground tank is less than fifteen years old and is protected from corrosion—OR — tank is synthetic (fiberglass).	Metal underground tank is less than fifteen years old and is not protected from corrosion.	Metal underground tank is more than fifteen years old.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Leak detection procedures (primarily for underground tanks)	Tank is regularly tested for leaks, and monthly fuel use accounting is done.		Monthly fuel use accounting is done.	<input type="checkbox"/> Low <input type="checkbox"/> High
Spill and overfill protection (for gasoline or diesel)	Filling is closely supervised.		Filling is unattended.	<input type="checkbox"/> Low <input type="checkbox"/> High
Tank containment(above-ground tanks)	Tank is on a containment pad/dike capable of holding 125% of the tank volume.	Tank is on an impervious surface without a berm or dike for containment.	Tank has no protection to contain major leaks and spills.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Tank security (for gasoline or diesel)	Tank or pump is surrounded by a 6-foot locked fence, plus there is a lock on the pump.	Fill hose is locked (a requirement in most states).	No fence or enclosure is around the tank and there are no locks.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Damage protection (aboveground and basement tanks)	Tanks and pumps are on stable concrete or steel supports. Tank is well-protected from damage by impact.		Tank is in contact with the ground or on poor footings. Tank is not well-shielded from impact.	<input type="checkbox"/> Low <input type="checkbox"/> High



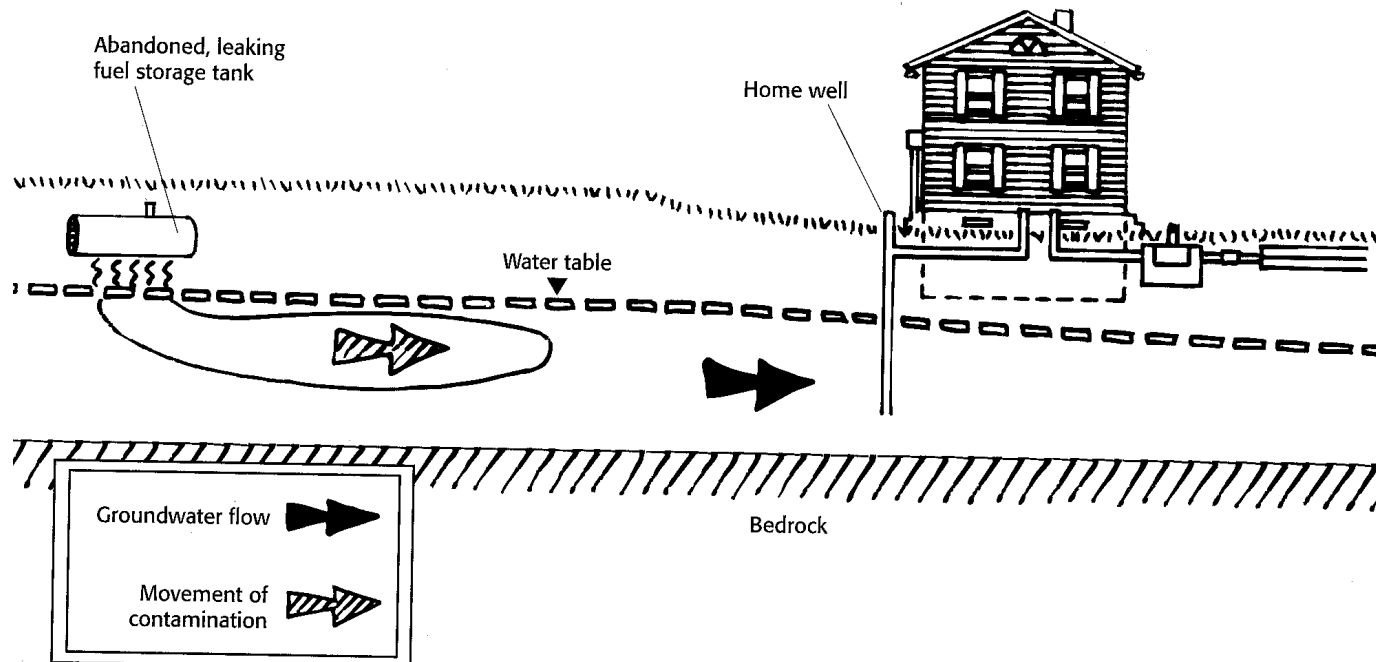


Figure 8.4
Abandoned fuel tanks on your property, or nearby, may contaminate your groundwater.

What if you find contamination?

You may discover leaks when a tank is removed. Inspect soil around and under a tank for obvious signs of leaking—odors, stains, or visible fuel. If you suspect contamination, you should schedule a more extensive site assessment right away.

Whenever you find a leak, you should report it to local officials and state regulators. They will expect you to do something about it to reduce harm to the environment. State or tribal funds may be available to help pay cleanup costs.

Document tank removal

To protect yourself against legal claims, you should photograph and document all the steps of removing your tank. Your written records should include: (1) the state agencies you contacted, (2) the date the tank was filled or removed, (3) the people or companies who did the work, and (4) certified records that contamination wasn't found—or, if it was found, detailed records of the resulting site examination.

Do Table 2c - Tank removal and abandoned tanks

If you have an abandoned or unused tank, do the table below. Write your risks in the right-hand column.

Responding to risks

Use the action checklist on the next page to record your medium and high risks. Plan to take actions to reduce your risks.

TAKE ACTION

When you finish the tables that apply to you, go back and make sure that you transferred all high and medium risks to the action checklist on the last page. For each risk, write down the changes you plan to make. Use this chapter and other resources to get ideas for what you can do to improve your situation.

Pick a target date that will keep you get started. You don't have to do everything at once, but try to eliminate the most serious risks as soon as you can. Often it helps to do the inexpensive things first.

Table 2c - Tank Removal and Abandoned Tanks

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Inactive Tanks	Inactive tanks have been removed.	Inactive tanks have been left in place, emptied, and filled with approved material. Caution: This may be illegal in some areas!	Inactive tanks have been abandoned and left underground (or aboveground).	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Inspection for contamination	Tank sites have been checked for signs of soil and groundwater contamination.		Tank sites have not been checked for signs for contamination.	<input type="checkbox"/> Low <input type="checkbox"/> High



For More Information

Local and state contacts

Contact the agencies and organizations mentioned in this fact sheet, your Extension office, or a tribal or state office of natural resources or environmental protection. They should have publications to send and experts on staff to help answer your questions.

Acknowledgments

*This fact sheet has been revised from the original coauthored by Richard Castelnuovo, National Farm*Home*Syst Office, Madison, Wisconsin and Dean Solomon, District Extension Natural Resources Agent, W. K. Kellogg Biological Station, Michigan State University Extension. The Farm*Home*Syst Petroleum Storage Training Manual was used as resource.*

ACTION CHECKLIST -

Fuels: Safely Using Gasoline, Heating Oil, Diesel and Other Fuels

Write all high and medium risks below.	What can you do to reduce the risk?	Set a target date for action.
Sample: Gas for lawnmower stored in a glass jug Smells different than it used to.	Buy a UL-approved container from the hardware	One week from today: May 15



4450-H — September 2001

To obtain additional fact sheets in the *Connected to the Earth* series, contact your local Extension office or call Montana State University's Extension housing program at (406) 994-3451.