



Keeping Idaho's Water Clean

Improving Petroleum Product Storage

1. Storage tank location

The distance between your liquid petroleum storage tank and your drinking water well is vitally important to reducing the risk of ground-water contamination. Petroleum storage tanks should be located at least 50 feet from a public water well according to state regulations. Existing wells are required by law to meet separation requirements in effect at the time they were constructed. Make every effort, however, to exceed the regulations whenever possible.

One gallon of gasoline containing one percent benzene can contaminate about two million gallons of ground water. Preventing spills and leaks is especially important because gasoline can move quickly through the soil. Although diesel fuel and fuel oil are more dense than gasoline and move more slowly through the soil, they too will eventually reach ground water.

Every site has unique geologic and hydrologic conditions that can affect ground-water movement. Petroleum products reach ground water more quickly if local soil is permeable. Sands and gravels are examples of permeable soils. Figure 1 illustrates petroleum product seepage into soils. It is preferable to locate a new tank at least 200 to 400 feet away from your well or your neighbor's well, to provide reasonable assurance that subsurface flow or seepage of contaminated ground water will not reach your well. If possible, the tank should also be located downslope from the well.

Regulations for siting above ground storage tanks are concerned more with the explosion potential of tanks than the ground-water pollution potential. To protect against explosion and fire, follow local siting regulations. Following state and federal regulations and recommendations can better protect the ground water supplying your well.

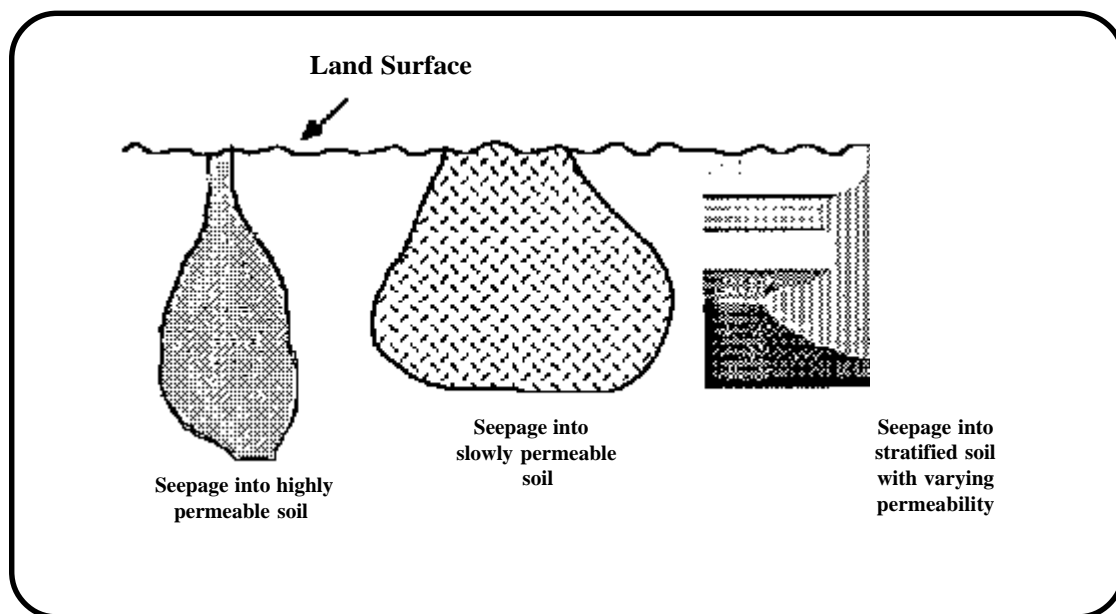


Figure 1: Petroleum product seepage into soils. Source: *Underground Tank Corrective Action Technologies*, EPA/625/6-87-015, January 1987.

New storage tank location

In addition to maintaining an adequate distance from your drinking water well or neighbor's well, choose a location for a new tank based on the following considerations:

- **Soil characteristics.** New underground storage tanks are required to be installed using backfill materials recommended by the manufacturer. Use clean backfill during installation to decrease the negative effects of surrounding soils. Highly corrosive clays, wet soils, and acid (low pH) soils can significantly speed up the rate of corrosion of unprotected underground metal tanks and piping.
- **Soil stability.** Assess the ability of the underlying soil to support both underground and above ground tanks. Properly anchor tanks in special locations, such as hillsides. Be sure that pipes cannot twist or break if the tank is bumped or disturbed.
- **Depth to groundwater.** Floodways or areas where the watertable is close to the surface are poor locations for storage tanks. Tanks placed in such areas require special installation. To reduce pollution potential, an above ground tank may be preferable to an underground tank in these situations.
- **Current and previous land use.** Sites that contain abandoned pipes and tanks, agricultural drainage tiles, or waste materials pose special installation problems. Any metal already in the ground at your chosen site will increase corrosion rates for the unprotected tank.
- **Traffic.** Assess traffic patterns around the tank. Determine whether the location of the tank or dispenser will block movement of farm vehicles during refueling or cause special problems if any work needs to be done on the tank. Protect the tank and piping from collisions with farm and fuel vehicles.

2. Tank design and installation

Whenever you install a fuel storage tank, carefully follow the manufacturer's recommended practices for installation. Proper installation is one way to minimize the leaking potential of the tank or the piping connected to it. Scratches on a metal tank that were caused by careless installation can increase corrosion and tank deterioration.

Most underground storage tanks with more than 1,100 gallons capacity (except tanks with heating oil which is consumed on site) must be registered with the Division of Environmental Quality (DEQ). Registration of new underground storage tank installations must be filed with the DEQ within 30 days of bringing such tank into use. Underground tanks are not designed to be used above ground, and are unsafe for such use.

Underground tanks

Federal law requires that new regulated underground petroleum storage tanks and all related piping used on a rural homestead must be constructed of approved materials such as fiberglass or steel with corrosion protection. A tank is considered to be "underground" if ten percent or more of the volume, including the pipes, is below the surface of the ground. **All regulated existing underground tanks and metallic product lines must have corrosion protection by December 23, 1998, if they are to remain in use.** Corrosion protection systems must be designed by a corrosion expert. Even if your tank system is not covered by these regulations, it is important that these design standards be followed.

Corrosion and its prevention

Corrosion (rust) is the deterioration of a metallic material due to a reaction with its environment. Corrosion damage to tanks is caused when a metal underground tank and its underground surroundings act like a battery. Part of the tank can become negatively charged, and another part positively charged. Moisture in the soil provides the connecting link that finally turns these tank "batteries" on. Then the negatively charged part of the underground tank system, where the current exits from the tank or its piping, begins to deteriorate. As electrical current passes through this part, the hard metal begins to turn into soft ore, holes form, and leaks begin.

Steel underground tanks can be protected from corrosion if they are bonded to a thick layer of noncorrosive material, such as **fiberglass reinforced plastic**. Also, the corrosion problem can be entirely avoided by using tanks made of noncorrosive material, such as fiberglass.

Other methods of corrosion protection include cathodic protection systems (sacrificial anodes) or internal lining.

- A **sacrificial anode** is a special material connected to the tank that is more electrically active than the steel tank. Because the anode is more active, electric current runs from the anode rather than from the tank. The tank becomes the cathode (positive electrode) and is **protected** from corrosion. The attached anode (negative anode) is "sacrificed" or consumed in the corrosion process. This method should only be used on new steel tank installations. Corrosion protection experts generally agree that sacrificial anodes do not work effectively or economically with most existing steel underground storage systems.
- **Interior liners** are made of noncorrosive synthetic materials and can also be effective in protecting metal tanks. Liners must be internally inspected according to regulations or combined with a cathodic protection system.
- **Impressed current** (*Figure 2*) is a corrosion protection system that introduces an electric current through a rectifier into the ground through a series of anodes that are not attached to the underground storage tank (UST). This current is sent through an insulated wire to the anodes, then flows through the soil to the underground tank system, and returns to the rectifier through an insulated wire attached to the UST. The UST system is protected because the current going to the UST system overcomes the corrosion-causing current normally flowing away from it.

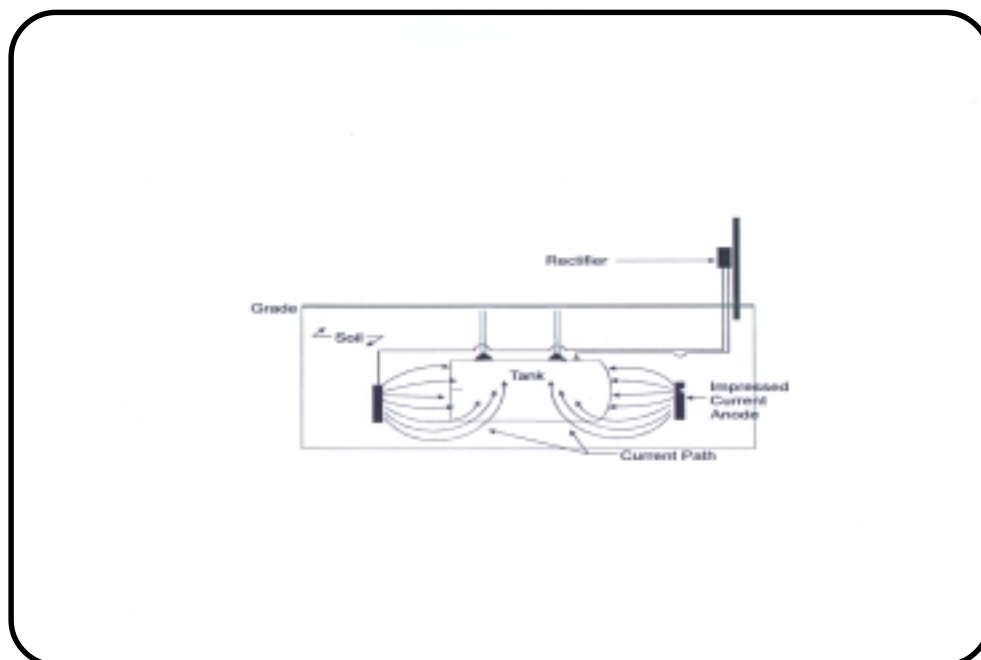


Figure 2

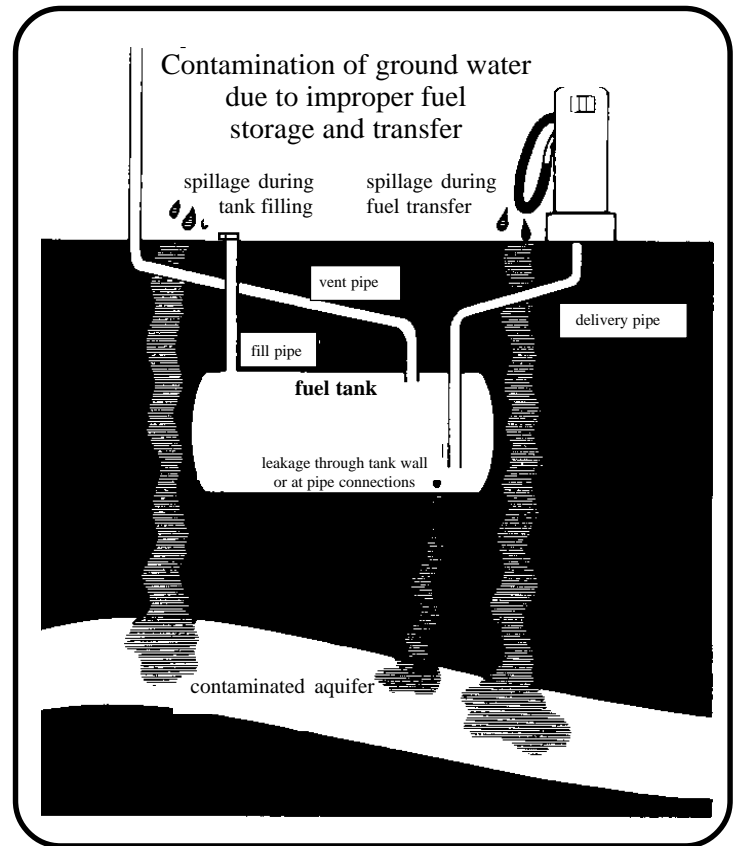


Figure 3: Contamination of ground water due to improper fuel storage and transfer.
 Source: *Handling and Underground Storage of Fuels, Cooperative Extension Service, Michigan State University, Extension Publication WQ01. Reprinted February 1986.*

Spill/Overfill prevention

Federal law requires that all new farm and residential underground tanks designed to hold 1,100 gallons or more (other than heating oil) have spill and overfill protection. Spill protection typically consists of a catch basin for collecting spills when filling the tank. Overfill protection is a warning or prevention of an overfill and must either automatically shut off the flow of product when the tank is 95 percent full or alert the operator when the tank is 90 percent full. Spill and overfill protection are important and relatively inexpensive; they can prevent a number of small releases over a long period of time from polluting the ground water. Figure 3 shows how ground water can be contaminated by underground tanks systems.

Above ground tanks

Regulations for above ground tank installation seek to reduce the potential for fire. To decrease ground-water pollution potential, place farm tanks within a secondary containment. Secondary containment can be a double-walled tank or a structure consisting of a dike and a pad. Piping should be made of cathodically protected steel, coated to prevent corrosion.

Above ground tanks and their installation are affected by a mosaic of local and federal regulations. The manufacturing of above ground tanks is self-regulated by the industry, with oversight provided by Underwriters Laboratories (UL). Industry standards for above ground storage tanks are detailed in UL 142. The best source of information on proper siting and installation of above ground storage tanks are local authorities, especially the local fire chief or State Fire Marshal.

3. Monitoring

Rules for regulated underground tanks require that tanks have a method of detecting leaks. Select the tank location carefully to ensure ease of installation and reliability of chosen leak detection methods. Test the tank periodically for leaks, and measure the tank inventory to help detect leaks before major problems develop.

Inventory control must be performed every operating day for underground systems which store and dispense fuel on a regular basis. While inventory measurement will not detect very small leaks, it will at least provide a warning that further investigation may be necessary.

Since cleanup of fuel leaks is always costly and often not totally effective, it is important to constantly monitor underground tanks containing petroleum products. If you have an underground petroleum storage tank on your property, be especially aware of the age of your tank as well as the need to establish a leak detection program.

Most existing tanks used on homesteads are bare steel. Because of this, tank or piping corrosion problems will eventually cause leaks. If your tank is more than 10 years old or if you don't know its age, make a special effort to determine whether leaks exist.

Existing regulations and good practice require that you use a method to detect leaks regularly. Release detection requirements can be met by a combination of annual tightness testing and inventory control, or through either automatic tank gauging, soil vapor monitoring, or other approved methods. Copies of the actual regulations, as well as release detection requirements and methods, are available by contacting DEQ at (208) 373-0502, or the DEQ regional office for your area (see *Contacts and References* section).

Protection of the ground-water resource is the most important consideration of a leak detection system. The closer the tank is to the homestead's drinking water well, the more important it is to ensure that an adequate leak detection system is in place.

Leaks and spills

If you find a leak or spill from an underground storage tank, state law requires that you notify the DEQ regional office for your area. First, contact your local fire department then take whatever actions are necessary to remedy the problem. Follow recommendations you receive when you report the spill or leak.

A leak or spill from an above ground storage tank is generally dealt with by a designated local emergency management agency, such as the fire department. Contact your local fire district and DEQ in case of an above ground leak or spill.

If your storage tank holds oil and has the "reasonable" potential to leak into navigable waters of the United States (e. g., Snake River), you may be required by the Environmental Protection Agency (EPA) to have a Spill Prevention Control and Countermeasure Plan (SPCC). An above ground storage tank with a capacity greater than 660 gallons, an above ground facility with a capacity greater than 1,320 gallons, or an underground storage tank with a capacity greater than 42,000 gallons must have an SPCC.

4. Insurance

Federal law requires that certain underground storage tank owners obtain pollution liability insurance so that releases can be cleaned up in a timely manner. Contact the Petroleum Storage Tank Fund at (208) 334-2370 for more information about the state sponsored program that can help you meet this requirement.

5. Underground tank removal and closure

Tanks that are no longer in use can cause problems for owners and operators many years later. They will continue to corrode and, if they still contain gas or oil, will likely contaminate ground water.

Try to determine the location of any unused tanks on your property. Also try to find out whether the tanks still hold materials or have holes. These tanks must be pulled from the ground and disposed of, or closed in place. Check to see if local ordinances prohibit the in-place closure of buried storage tanks before deciding which option to pursue.

State law requires that only certified removers pull or close in-place farm and residential regulated tanks with over 1,100 gallons capacity, unless the owner does all work and follows industry standards. An environmental site assessment is required, and DEQ must be notified 30 days before any regulated tank can be removed or closed in place. As part of the underground storage tank removal process, all associated buried piping should be removed.

In addition, notify your local fire department at least 30 days before pulling or closing any petroleum tank. This will ensure that precautions are taken to prevent an explosion or other problem. Deaths have occurred due to improper closure or pulling of a tank. The importance of safety during removal or closure should not be overlooked.

You should document steps you take to legally close your tank — including notifying DEQ that the tank has been closed — so that you are protected from legal action.

Any questions regarding underground storage tank removal or in-place closure should be directed to DEQ (208) 373-0502 or to the DEQ regional office for your area (see *Contacts and Reference* section).

Contacts and References

Who to call about...

Underground storage tank registration, reporting closure and changes in tank ownership, and general information:

- Idaho Division of Environmental Quality (DEQ) (208) 373-0502.

Above ground storage tank siting and installation

- Contact your local fire department or State Fire Marshal (208) 334-4370 for information on proper siting and installation of above ground tanks.

Environmental Protection Agency regulations

- U. S. EPA Region X, (800) 424-4372 or Idaho Operation's Office (208) 334-1450.

Petroleum storage tank insurance

- Contact Petroleum Storage Tank Fund (208) 334-2370.

Petroleum product spills from underground storage tanks

- Releases from underground storage tanks must be reported to the appropriate DEQ regional office within 24 hours. The reporting numbers for the regional offices are:

North (Coeur d'Alene):	(208) 769-1422
North Central (Lewiston):	(208) 799-4370
Southwest (Boise):	(208) 373-0550
South Central (Twin Falls):	(208) 736-2190
Southeast (Pocatello):	(208) 236-6160
Eastern (Idaho Falls):	(208) 528-2650

Effects of gasoline-contaminated ground water

- U.S. Environmental Protection Agency's Safe Drinking Water Hotline. Call toll free, (800) 426-4791 from 6:30 a.m. to 3:00 p.m. Mountain Standard Time.

Fire protection

- Contact your local fire department or State Fire Marshal (208) 334-4370.

What to read about...

Publications are available from sources listed at the end of the reference section. Refer to number in parentheses for the source of each publication.

Ground water contamination, protection, and testing

- *Idaho Cleanup Requirements for Petroleum Contaminated Soil*, Idaho UST Information Series: #1. (2)
- *Idaho Petroleum Release Response and Corrective Action Requirements*, Idaho UST Information Series: #2. (2)
- *Guidelines for TPH Analysis of Petroleum Contaminated Soils*, Idaho UST Information Series: #5. (2)
- *Protocol for Sampling and Analysis of Used Oil*, Idaho UST Information Series: #6 (2)

Tank design, installation, and site selection

- *Recommended Practices for Installation of Underground Liquid Storage Systems*. 1994. Petroleum Equipment Institute, PEI/RP 100-94. \$15, includes shipping. (4) Eleven-chapter technical document, including detailed steps and diagrams, covering such areas as material handling, release detection, cathodic protection, and testing and training.
- *Recommended Practices for Installation of Aboveground Storage Systems at Motor Vehicle Fueling Sites*, 1992. PEI/RP 200-92. \$15, plus shipping. (4)
- *Storage and Dispensing of Flammable and Combustible Liquids on Farms and Construction Projects*, Uniform Fire Code, Article 79, Division 10. The Uniform Fire Code was developed by the International Fire Code Institute and has been adopted by most western states as the state fire code.
- *UL (Underwriter's Laboratory) 142: Standard for Safety. Steel: Aboveground Tanks for Flammable and Combustible Liquids*. Details the UL design standard for above-ground storage tanks. A copy of the standard can be obtained for a fee from UL by calling (708) 272-8800.

Tank regulations, testing, closure, and financial responsibilities

- *Musts for USTs: A Summary of New Regulations for UST Systems*. (2, 3)
- *Dollars and Sense: A Summary of Financial Responsibility for UST Systems*. (2, 3)
- *Unused Underground Residential Heating Oil Tanks*, Idaho UST Information Series: #8 (2)
- *Don't Wait Until 1998: Spill, Overfill, and Corrosion Protection for Underground Storage Tanks*. (2,3)
- *Straight Talk on Tanks: Common Questions on Leak Detection* (2)
- *Doing Inventory Control Right: For Underground Storage Tanks* (2,3)
- *Manual Tank Gauging: For Small Underground Storage Tanks* (2,3)
- *Recommended Practices for Site Assessments During Closure of Underground Storage Tanks Containing Petroleum*, Idaho UST Information Series: #3 (2)
- *Permanent Tank Closure*, Idaho UST Information Series: #4 (2)

Spanish language

- *Normas Y Procedimientos Para TSA. (3)*

Publications available from...

- Your county Cooperative Extension System office. There may be charges for publications, postage, and sales tax.
- Division of Environmental Quality, Underground Storage Tank Program, 1410 N. Hilton, Boise, Idaho 83706, (208) 373-0260.
- U.S. Environmental Protection Agency-Region X, 1200 6th Ave., Seattle, Washington, 98101, (800) 424-4372.
- Petroleum Equipment Institute, P.O. Box 2380, Tulsa, Oklahoma 74101, (918) 494-9696.