



# Source Water Protection Practices Bulletin

## Managing Underground Storage Tanks to Prevent Contamination of Drinking Water

This fact sheet focuses on the management of underground storage tanks (USTs) to prevent contamination of drinking water sources (ground water and surface water used as public



drinking water supplies). USTs are tanks and any connected underground piping that have at least ten percent of their combined volume underground. USTs contain either petroleum or hazardous substances identified by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), except those substances listed as hazardous wastes. Over 95 percent of USTs contain petroleum.

### UNDERGROUND STORAGE TANK USE

You are likely to find many USTs in the vicinity of the water sources you want to protect. Currently, the U.S. EPA regulates about 714,000 active USTs located at about 269,000 sites nationwide. Many USTs are located at filling stations that fuel vehicles. In addition to thousands of roadside filling stations, USTs can be found at airports, school bus barns, hospitals, automotive repair shops, military bases, industrial plants, residential areas and other facilities.



Some USTs, like the following, do not need to meet the Federal requirements:

- USTs not storing either petroleum or certain hazardous substances;
- Farm and residential tanks of 1,100 gallons or less capacity holding motor fuel used for noncommercial purposes;
- Tanks storing heating oil used on the premises where it is stored;
- Tanks on or above the floor of underground areas, such as basements; and
- Septic tanks and systems for collecting storm water and wastewater.

Please note, however, that State UST regulations may be more stringent or differ in other ways from the Federal requirements. You must check with local regulatory authorities to make sure which USTs are subject to what requirements. For example, some States regulate heating oil tanks and farm and residential tanks. Even if your UST does not need to meet Federal, State, or local requirements, you should strongly consider implementing some of the prevention measures mentioned in this fact sheet to preclude future releases.

## **WHY IS IT IMPORTANT TO MANAGE UNDERGROUND STORAGE TANKS NEAR THE SOURCES OF YOUR DRINKING WATER?**

Most UST releases result from the corrosion of parts, improper installation, failure of piping systems, poorly conducted fuel deliveries (spills and overfills), and improper operation and maintenance of the UST system.

UST releases can contaminate soil and drinking water supplies. As of September 2000, almost 412,000 UST releases had been confirmed. Once in the soil, these releases can move rapidly and threaten drinking water supplies. EPA estimates that about half of UST releases reach ground water.



Leaking pipe from UST

Petroleum includes carcinogenic compounds such as benzene. Even at very low levels, fuel contaminants in water may not be detected by smell or taste, yet they can affect human health. Petroleum can also contain the additive methyl tertiary butyl ether (MTBE), which can make water smell and taste bad enough to be undrinkable. And it does not take much pollution to create a drinking water problem. For example, an unrestricted gasoline leak of one drop per second releases about 400 gallons per year. Even a few quarts of gasoline in the ground water can pollute a drinking water well. Also, cleaning up contaminated soil and ground water involves expensive operations. Average cleanup costs at leaking UST sites are about \$125,000, and ground water cleanup at some sites exceeds \$1 million.

## **AVAILABLE PREVENTION MEASURES TO ADDRESS UNDERGROUND STORAGE TANKS**

Federal UST regulations were promulgated in 1988 to prevent and detect UST releases (see 40 CFR Part 280). The following paragraphs briefly identify some basic UST requirements. Please keep in mind that individual prevention measures may or may not be adequate to prevent contamination of source waters. Most likely, individual measures should be combined in an overall prevention approach that considers the nature of the potential source of contamination, the purpose, cost, operational, and maintenance requirements of the measures, the vulnerability of the source water, the public's acceptance of the measures, and the community's desired degree of risk reduction.

### **Federal UST Requirements**

***Proper installation.*** USTs must be installed according to industry standards with great care to maintain the integrity and the corrosion protection of the tank.



Tanks must also be *properly sited* away from wells, reservoirs, and floodplains. Ideally, all types of USTs should be located outside of source water protection areas.

**Corrosion protection.** UST systems must be made of noncorrodible material, such as fiberglass, or have corrosion protection provided in other ways, such as by being made of externally coated and cathodically protected metal, having double-walls, metal having a thick corrosion resistant cladding or jacket, or having an internal tank lining.



Excavated USTs

**Spill protection.** USTs must have catchment basins that can catch spills that may occur when the delivery hose is disconnected from the fill pipe. A catchment basin is basically a bucket sealed around the fill pipe.



**Overfill protection.** When an UST is overfilled, large volumes can be released at the fill pipe and through loose fittings on the top of the tank or a loose vent pipe. USTs must have overfill protection devices, such as automatic shutoff devices, overfill alarms, and ball float valves. In addition, proper filling procedures during fuel delivery must be followed to reduce the chance of spills or overfills.

**Leak detection.** Leak detection options include automatic tank gauging, interstitial monitoring, statistical inventory reconciliation, vapor monitoring, and ground water monitoring. All leaks must be detected in a timely manner, before they become big cleanup and liability problems.

**Proper closure.** The regulatory authority needs to be notified 30 days before UST closure, and a determination must be made if any contamination of the environment has occurred. The tank must be emptied and cleaned, after which it may be left underground or removed. Standard safety practices should always be followed when emptying, cleaning, or removing tanks.

Additionally, some large capacity UST owners — those who have more than 42,000 gallons of oil storage capacity at one site — may need to comply with Federal Spill Prevention Control and Countermeasures (SPCC) regulations. Refer to the above ground storage tank fact sheet or 40 CFR Part 112 for information.

### **Additional Prevention Measures**

Local jurisdictions may want to implement *registration programs* for exempt tanks, in order to exercise some oversight of their construction and operation.

Local governments can use *land use controls* to address some of the potential risks from USTs. For example, zoning can restrict these activities to specific geographic areas that are away from drinking water sources. Prohibition of gas stations (which use USTs) or residential

heating oil tanks in source water protection areas can reduce the risk that harmful contaminants may enter source water. Local governments may also require permits that impose additional requirements such as setbacks, open spaces, buffers, walls and fences; street paving and control of site access points; and regulation of hours and methods of operation.

Work with your State and local UST regulatory authorities to ensure that *adequate inspection* of UST sites takes place regularly — inspections that verify whether USTs are properly equipped, operated, and maintained so they will not pose a threat to your water source. State UST program contacts are among the many resources found at the Web site described below.

## **FOR ADDITIONAL INFORMATION**

Information and publications on UST regulations and best management practices can be obtained at no cost on the Internet at the following Web site address maintained by EPA's Office of Underground Storage Tanks: <http://www.epa.gov/OUST/>. You can also call an EPA Hotline at 1-800-424-9346 for assistance and to order helpful publications about USTs. The most useful general publication is called "Musts For USTs," a basic plain language description of UST types and Federal requirements. Also, see EPA's Drinking Water Academy Web site at <http://www.epa.gov/safewater/dwa.html> for a listing of documents on management measures.

Contact local government authorities in your area to see if there are ordinances in place to manage USTs. Numerous examples of local source water protection-related ordinances for various potential contaminant sources can be found at:

<http://www.epa.gov/r5water/ordcom/>

<http://www.epa.gov/owow/nps/ordinance/>

<http://www.epa.gov/owow/nps/ordinance/links.htm>

The following documents provide additional information on UST prevention measures and regulations:

American Petroleum Institute. *Preventing Spills in Storage Tanks*. (1999, February 16). Retrieved February 9, 2001 from the World Wide Web: <http://www.api.org/oilspills/tanks.htm>

Iowa Department of Natural Resources. *Groundwater Protection Fact Sheet – Underground Storage Tanks*. (1996, August). Retrieved February 9, 2001 from the World Wide Web: [www.state.ia.us/dnr/organiza/wmad/lqbureau/ust/genust1.htm](http://www.state.ia.us/dnr/organiza/wmad/lqbureau/ust/genust1.htm)

Iowa Department of Natural Resources, Waste Management Assistance Division. *Underground Storage Tanks – Frequently Asked Questions*. (2001, January 15). Retrieved February 9, 2001 from the World Wide Web: <http://www.state.ia.us/dnr/organiza/wmad/lqbureau/ust/index.htm>

Minnesota Pollution Control Agency. *Underground Storage Tank (UST) Systems*. (2000, December 27). Retrieved February 9, 2001 from the World Wide Web: <http://www.pca.state.mn.us/cleanup/ust.html>

Purdue University Extension Service. *Petroleum Product Storage Practices on the Farm*. (1991). Retrieved February 12, 2001 from the World Wide Web: <http://pasture.ecn.purdue.edu/~epados/farmstead/fuel/src/title.htm>

South Dakota Department of Environment and Natural Resources, Ground Water Quality Program. *Don't Wait Until 98*. (n.d.). Retrieved February 9, 2001 from the World Wide Web: <http://www.state.sd.us/denr/DES/Ground/tanks/dont-2.htm>

South Dakota Department of Environment and Natural Resources, Ground Water Quality Program. *Frequently Asked Questions about UST and AST Systems*. (n.d.). Retrieved February 19, 2001 from the World Wide Web:  
<http://www.state.sd.us/denr/DES/Ground/tanks/FAQTANK.htm>

U. S. Environmental Protection Agency, Region 7. *Region 7 Underground Storage Tank Fact Sheet – Understanding the 1998 Requirements*. (1998/1999, winter). Retrieved February 9, 2001 from the World Wide Web:  
<http://www.epa.gov/region7/programs/artd/ustbx/index2.htm>

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. *Musts for USTs – A Summary of Federal Regulations for Underground Storage Tank Systems* (EPA 510/K-95-002). (1995, July). Retrieved January 31, 2001 from the World Wide Web: <http://www.epa.gov/swerust1/pubs/>

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. *Straight Talk on Tanks – Leak Detection Methods for Petroleum Underground Storage Tanks and Piping* (EPA 510/B-97-007). (1997, September). Retrieved January 31, 2001 from the World Wide Web: <http://www.epa.gov/swerust1/pubs/>

U.S. Environmental Protection Agency, Office of Underground Storage Tanks. *Upgrading UST Systems*. (1998, May 27). Retrieved January 31, 2001 from the World Wide Web: <http://www.epa.gov/swerust1/ustsystem/upgrade.htm>

U.S. Environmental Protection Agency, Office of Underground Storage Tanks. *What Do You Need to Know about Underground Storage Tanks?* (1999, June 7). Retrieved January 31, 2001 from the World Wide Web: <http://www.epa.gov/swerust1/cmplastc/knowneed.htm>