K-STATE Kansas State University

FARM•A•SYST
Farmstead Assessment System

Fact Sheet 4

Reducing the Risk of Groundwater Contamination by
Improving Fuel Storage

1. Storage tank location

The most important aspect of your fuel storage tank location is how close it is to your drinking water well. State well regulations (Article 30 of the Kansas Administrative Regulations) require that fuel storage tanks be located at least 50 feet from a drinking water well. Minimum separation distances regulate new well installation. Existing wells are required by law only to meet separation requirements in effect at the time of well construction. 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 groundwater. Preventing spills and leaks is especially important because of how quickly gasoline can move 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 groundwater.

Every site has unique geologic and hydrologic conditions that can affect groundwater movement. How quickly the petroleum product reaches groundwater will also depend upon local soils. The more porous the soil (sands and gravels, for example), the faster the rate of downward movement to groundwater.You may choose to locate a new tank at least 200 to 400 feet away from your well, to provide reasonable assurance that subsurface flow or seepage of contaminated groundwater will not reach your well. If possible, the tank should also be located downslope from the well.

2. Aboveground Fuel Storage

Aboveground fuel storage tanks are those in which more than 90 percent of the tank volume, including piping, is located aboveground or above the floor of an underground chamber, such as a basement.

All farm aboveground fuel storage tanks with more than 1100 gallons must be registered with the Kansas Department of Health and Environment (KDHE). New aboveground fuel tank installations of over 1100 gallons, or modifications to existing systems, must also be approved in advance by the State Fire Marshall's office to verify the tank meets applicable fire codes. Contact the KDHE Aboveground Storage Tank Section at (913) 296-8061 for more information on registration and permitting of aboveground fuel storage tanks.

Aboveground tanks are easier to maintain and monitor than underground tanks, and leaks are easier to discover and clean up. Storing fuel aboveground does have some disadvantages, such as the risk of accidents and damage to the tank and increased loss to evaporation.

For glossary, see page 2 of Worksheet 4.

Design and installation

Aboveground fuel storage systems should be designed in such a manner as to protect

against spills and leaks and to provide safety from fire hazards.

- Be sure all tanks are stable and solid.
- A concrete pad in the filling area can prevent a number of small spills over a period of time from contaminating groundwater.
- Regular inspection for leaks and having the fuel storage area clean can help in early detection of leaks.
- Inspect hoses and connections periodically for leaks.
- Having fuel storage in a low activity area, and either fenced or otherwise protected from machinery and equipment, can also help to prevent accidents which may cause a spill.
- Secondary containment is required for all aboveground storage tanks with over 1100 gallons capacity. Including secondary containment as part of any fuel storage system, however, can assure protection from leaking tanks.

Secondary containment serves two purposes: 1) Fire safety requires that burning liquids should be contained in an isolated location away from structures, and should permit firefighters to approach the area safely; and 2) Environmental concerns require that petroleum and hazardous liquids not be permitted to cause widespread contamination by either seeping into the ground or by travelling on the surface to contaminate soil or water.

Secondary containment for aboveground fuel tanks should be constructed of concrete or steel and be capable of holding at least 110 percent of the contents of the largest tank inside the containment. Steel containment structures are typically manufactured by the tank supplier as part of a "tank in a box" unit. All structures should have a drain or sump which allows removing water or the fuel without uncontrolled drainage from the tank area. A roof or other rain protection can prevent rainwater from entering the structure.

Double wall tanks may meet requirements with additional containment such as a low berm or curb in some situations. Earth berm containments are common with many older tanks but will not be approved by KDHE for new installations.

3. Underground Fuel Storage

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 farm underground storage tanks with more than 1100 gallons capacity (except heating oil storage for single family residences) must be registered with the KDHE. An application for new underground storage tank installations must be filed with KDHE for review and approval prior to installation. It is illegal to reuse an underground tank above ground.

Tank design and installation

Whenever you install an underground fuel storage tank, carefully follow the manufacturer’s recommended practices for installation. Proper installation is one sure way to minimize the leaking potential of the tank or the piping connected to it. Even scratches in a metal tank caused by careless installation can increase corrosion and tank deterioration.

Federal law requires that all new underground petroleum storage tanks designed to hold 1100 gallons or more and all related piping must be constructed of non-metallic

materials such as fiberglass or have corrosion protection. All 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 and approved by KDHE before being added to an existing underground storage system. Methods of corrosion protection include cathodic protection systems (sacrificial anodes) or internal lining.

A sacrificial anode is a special material connected to the tank with a greater tendency to corrode than the tank material. The anode will typically protect the tank and piping for up to 30 years.

Interior liners are made of noncorrosive synthetic materials and can also be effective in protecting metal tanks but must be internally inspected according to regulations or combined with a cathodic protection system.

Kansas Administrative Regulations (K.A.R. 28-44-13 through 28-44-27) require that all new farm underground tanks designed to hold 1100 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; they can prevent a number of small releases over a long period of time from polluting the groundwater. Figure 1 shows how groundwater can be contaminated by underground tanks.

Monitoring

Existing regulations and good practice require that you have a method for regularly detecting leaks. Release detection requirements can be met by any one of a number of potential methods including annual tightness testing, automatic tank guaging, soil

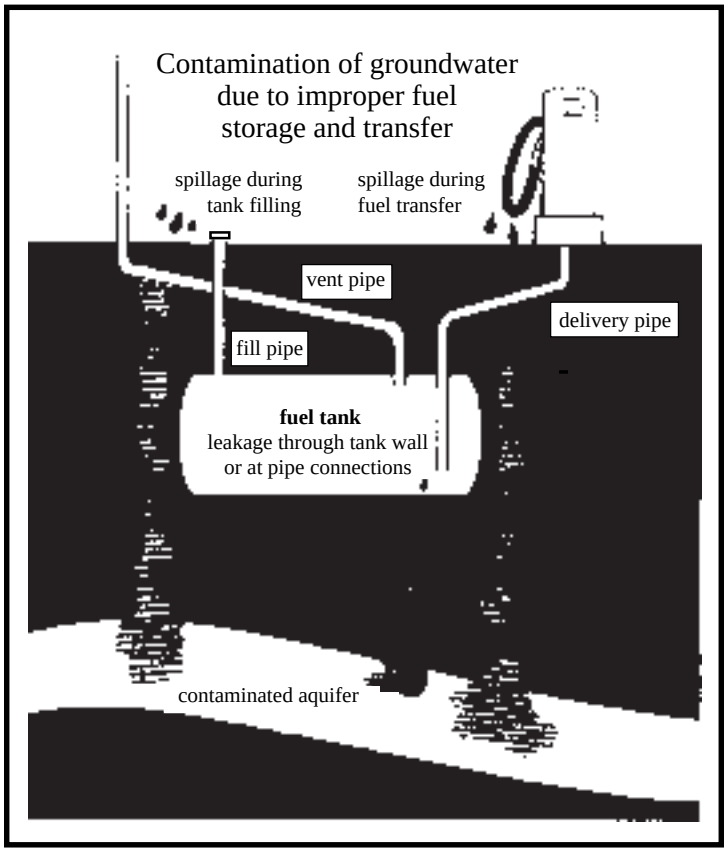

Figure 1: Contamination of groundwater due to improper fuel storage and transfer. *Source: Handling and Underground Storage of Fuels, Cooperative Extension Service, Michigan State University, Extension Publication WQ01. Reprinted February 1986.*

vapor monitoring or other approved methods. Measurement of underground tank inventories is also required. Copies of the actual regulations, as well as release detection requirements and methods, are available by contacting KDHE at (913) 296-1678, or the KDHE district office for your area (see contacts and references).

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 farm, be especially aware of the age of your tank as well as the need to establish a leak-detection program.

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

Petroleum Storage Tank Release Trust Fund

The Department of Health and Environment administers the Petroleum Storage Tank Release Trust Fund, which can reimburse tank owners for a substantial percentage of costs incurred in cleaning up a problem for regulated tanks. This trust fund is for both aboveground and underground petroleum storage tanks. Residential and farm vehicle fuel tanks with less than 1100 gallons capacity are not regulated; however, they may be eligible for this assistance if the tanks are registered with KDHE.

Spills and releases which result from overfilling tanks are not subject to trust fund reimbursement. Other spills or releases when dispensing fuel from a tank, or when tanks are moved or damaged, may be the subject of trust fund reimbursement.

For more information about the fund, contact KDHE at (913) 296-1678 (underground tanks) or (913) 296-8061 (aboveground tanks).

4. Underground tank removal and closure

Tanks no longer in use can cause problems for owners and operators many years later. Try to determine the location of any unused tanks on your property. Also try to find out whether the tanks still hold product or have holes. These tanks must be pulled from the ground and disposed of, or abandoned in place. Check to see if local ordinances prohibit the in-place abandonment of buried storage tanks before deciding which option to pursue.

An environmental site assessment is required and KDHE must be notified before any tank can be removed or abandoned in place. As part of the buried storage tank removal process, KDHE requires that associated buried piping be removed as well. With adequate notice, KDHE field staff can inspect the tank removal site and perform a site assessment at no cost.

If the tank is to be abandoned in place you must hire an environmental professional to perform the site assessment prior to abandonment. Once KDHE has evaluated the site assessment and approved the closure, the tank may be filled with an inert solid mate-

rial such as sand. If contamination exceeding KDHE standards is discovered at any closure site, remedial action will be required.

Before pulling or closing a tank, always notify your local fire department at least one month ahead of time. 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 the Department of Health and Environment that the tank has been closed—so that you are protected from legal action in the event of future groundwater problems.

Any questions regarding underground storage tank removal or in-place abandonment should be directed to KDHE at (913) 296-1678 or to the KDHE district office for your area.

CONTACTS AND REFERENCES

Who to call about...

Underground tank registration, reporting, closure, changes in tank ownership

Kansas Department of Health and Environment, (913) 296-1678.

Aboveground Storage Tank Program

Kansas Department of Health and Environment, (913) 296-8061.

EPA regulations

U.S. EPA Region VII, 726 Minnesota Avenue, Kansas City, Kansas 66101, (913) 236-2800.

Petroleum product storage, tank testing methods and suppliers

Kansas Department of Health and Environment, Bureau of Environmental Remediation, Forbes Field, Building 740, Topeka, Kansas 66620, (913) 296-1678, or the appropriate KDHE district office for your area:

Southwest District (Dodge City): (316) 225-0596
South Central District (Wichita): (316) 838-1071
Southeast District (Chanute): (316) 431-2390
Northeast District (Lawrence): (913) 842-4600
North Central District (Salina): (913) 827-9639
Northwest District (Hays): (913) 625-5664

Petroleum product spills

Kansas Department of Health and Environment, Bureau of Environmental Remediation, (913)296-1679 between 8 a.m. and 4:30 p.m., or (913) 296-1500 after hours.

Financial assistance

For information about the Petroleum Storage Tank Release Trust Fund, contact the Department of Health and Environment, Bureau of Environmental Remediation (913) 296-1678 (underground tanks), or (913) 296-8061 (aboveground tanks).

Effects of gasoline-contaminated groundwater

Kansas Department of Health and Environment, Bureau of Environmental Quality, (913) 296-3565.

U.S. Environmental Protection Agency's Safe Drinking Water Hotline.
Call toll free, 1(800)426-4791 from 7:30 a.m. to 4 p.m. Central Standard Time.

Fire Protection

Kansas State Fire Marshal's Office, (913) 296-3401

What to read about...

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

Groundwater contamination, protection and testing

Groundwater and Well Contamination. MF-932. (1)
Managing the Farmstead to Minimize Groundwater and Well Contamination. MF-948. (1)
Safe Domestic Wells. MF-970. (1)
Ensuring Safe Drinking Water. MF-952. (1)
Suggested Water Tests for Private Systems. MF-871. (1)
Taking a Water Sample. MF-963. (1)
Testing to Help Ensure Safety of Drinking Water. MF-951. (1)
Commercial Laboratories Certified for Water Quality Tests. MF-872. (1)
Understanding Your Water Test Report. MF-912. (1)

Tank design, installation and site selection

Recommended Practices for Installation of Underground Liquid Storage Systems. 1987. Petroleum Equipment Institute, PEI/RP 100-87. (4)
Eleven-chapter technical document, including detailed steps and diagrams, covering such areas as material handling, release detection, cathodic protection, and testing and training.

The Interim Prohibition: Guidance for Design and Installation of Underground Storage Tanks. U.S. Environmental Protection Agency. EPA/530-SW-85-023.
Longer document, contains technical information. (3)

Tank regulations, testing, closure and financial responsibilities

Kansas State Fire Marshal's Regulations. (6)

Kansas Department of Health and Environment Aboveground Storage Tank Regulations . (2)

Kansas Department of Health and Environment Underground Storage Tank Regulations. (3)

Musts for USTs: A Summary of New Regulations for UST Systems. U.S. Environmental Protection Agency. (5)

Dollars and Sense: A Summary of Financial Responsibility for UST Systems. U.S. Environmental Protection Agency. (4)

Publications available from...

1. Your county Extension office or directly from Extension Distribution Center, Umberger Hall, Kansas State University, Manhattan, Kansas 66506, (913) 532-5830. There may be charges for publications, postage and sales tax.

2. Kansas Department of Health and Environment, Aboveground Storage Tank Section, Forbes Field, Building 740, Topeka, Kansas 66620, (913) 296-8061.

3. Kansas Department of Health and Environment, Forbes Field, Building 740, Topeka, Kansas 66620, (913) 296-1678.

4. U.S. Environmental Protection Agency, Office of Underground Storage Tanks, 401 M Street S.W., Washington, D.C. 20460.

5. Petroleum Equipment Institute, P.O. Box 2380, Tulsa, Oklahoma 74101.

6. Kansas State Fire Marshal's Office, 700 SW Jackson, Topeka, Kansas 66603, (913) 296-3401.

FARM•A•SYST
Farmstead Assessment System

The Farmstead Assessment System is a cooperative project of the Cooperative Extension Service, Kansas State University, and the Kansas Department of Health and Environment.

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Publications from Kansas State University are available on the World Wide Web at: http://www.oznet.ksu.edu

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