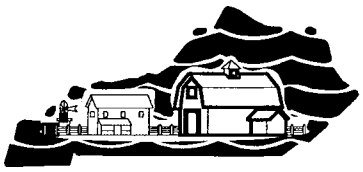

KY•A•Syst

Home and Farmstead
Water Quality Assessment

Assessing and Reducing the Risk of Groundwater Contamination from

PETROLEUM PRODUCT STORAGE

Why should I be concerned?

Kentucky's groundwater is one of its most vital resources. It supplies drinking water for hundreds of thousands of Kentuckians. Groundwater is the source of water for drinking water wells, springs, and some municipal, or "city," water supplies. All of us do things at our homes every day which can possibly pollute the groundwater. Nobody wants to pollute the groundwater, but if we are not careful and educated about how we manage our day-to-day home or farmstead activities, we can do just that– pollute the groundwater that serves as drinking water for many families. Even if nobody in your community uses groundwater for drinking water, you need to be concerned. This is because groundwater that underlies your home may travel a long way and eventually end up as another family's drinking water.

Aboveground and underground storage of liquid petroleum products, such as motor and heating fuels, is a possible source of groundwater contamination. Nearly one out of every four underground tanks in the U.S. may now be leaking, according to the EPA. If an underground petroleum storage tank is more than 20 years old, especially if it's not protected against corrosion, the potential for leaking is dramatically increased. Newer tanks and piping can leak, especially if they were not installed properly.

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 one year. Even a few quarts of gasoline in the groundwater may be enough to severely pollute drinking water. At low levels of contamination, petroleum contaminants in water cannot be detected by smell or taste, yet the seemingly pure water may be contaminated to the point of affecting human health. Preventing tank spills and leaks is especially important because of how rapidly gasoline, diesel, and fuel oil can move through surface layers and into the groundwater. Also, vapors from an underground leak that collect in basements, sumps, or other underground structures have the potential to explode. Selling property with an old underground tank may also be difficult.

The goal of KY•A•Syst is to help you protect the groundwater that supplies drinking water for many families.

How will this publication help me protect the groundwater?

Part I of this publication will help you protect the groundwater by asking you questions about your petroleum product storage. These questions will help you identify activities or structures on your property which may put groundwater at a high risk of being contaminated. Part II of the publication will give suggestions on how to reduce the risk of groundwater contamination by improving your petroleum product storage practices.

The KY•A•Syst program is for your benefit only. No information from this publication needs to leave your home. KY•A•Syst does not attempt to offer legal advice or solutions to individual problems but rather to raise general awareness about groundwater protection strategies. Questions about individual problems should be addressed to the appropriate professional.

Part I. *Assessing* the Risk of Groundwater Contamination from Petroleum Product Storage

Instructions:
Circle the number in front of the appropriate item that **best** describes your home or farmstead. (Skip and leave blank any categories that don't apply to your home or farmstead.)

LOCATION (all tanks)

What is the position of your tank(s) in relation to any water well, spring, cistern, sinkhole, stream, or other water resource?

4 Tank downslope more than 150 feet from any well, spring, cistern, sinkhole, or other water resource in medium- or fine-textured soils (silt loam, loam, clay loam, silty clay).
3 Tank at grade or upslope more than 150 feet from any well, spring, cistern, sinkhole, or other water resource in medium- or fine-textured soils (silt loam, loam, clay loam, silty clay).
2 Tank downslope more than 150 feet from any well, spring, cistern, sinkhole, or other water resource in coarse-textured soil (sand, sandy loam).
1 Tank at grade or upslope less than 150 feet from any well, spring, cistern, sinkhole, or other water resource in coarse textures soil (sand, sandy loam).

Where is the tank(s) located, and what type of soil is around the tank(s)?

4 Well-drained soils. Water table always beneath tank. Aboveground tank more than 50 feet from buildings.
3 Moderately well-drained soils. Only occasionally high water table.
2 Located more than 50 feet from buildings. Medium- or fine-textured soils (silt loam, loam, clay loam, silty clay) saturated seasonally.
1 Located near buildings and in area with fine-textured soils (clay loams, silty clay) often saturated.

DESIGN AND INSTALLATION (all tanks)

What type of tank is it? How old is the tank? Does it have corrosion protection?

4 Synthetic tank or tank protected from rust by cathodic protection (see glossary).
3 Steel tank less than 15 years old, coated with paint or coated with asphalt.
2 Painted/coated tank 15 or more years old, **OR** bare steel tank less than 15 years old.
1 Bare steel tank 15 or more years old.

What is the piping like on your tank?

4 Piping protected from rust by cathodic protection, sloped back to tank. Check valve at pump (not at tank). New discharge hose.
3 Piping galvanized. Pipe drains back to tank. Check valve at pump.
2 Pipe galvanized or painted. Piping sloped back to tank, but check valve located at tank (foot valve).
1 Piping bare, cannot drain freely to the tank. All pressure pipe systems. Old, weathered, and checked discharge hose.

Who installed the tank?

4 Installed by state certified installer or tank seller.
3 Installed according to recommendations provided with new tank provided by tank seller.
2 No information on installation.
1 Installed without backfill, setback, secondary containment, anchors, and other protection systems or by an untrained individual.

DESIGN AND INSTALLATION (aboveground tanks only)

Does the aboveground tank have secondary containment?

4 Tank placed within concrete or synthetic dike with pad able to hold 100 percent of tank capacity, **OR** a double-walled tank is used.
3 Tank placed on concrete pad with curbs.
2 Tank placed on concrete pad without curbs.
1 No secondary containment.

Is the aboveground tank enclosed (protected) by a fence or other structure?

4 Tank surrounded by 6-foot tall noncombustible building or fence with lock. Building well ventilated.
3 Tank surrounded by low fence with lock.
2 Tank surrounded by low fence. No lock.
1 No enclosure.

MONITORING (all tanks)

How often do you check the inventory of your tank(s)? Do you have the integrity of your tank(s) checked with tank tightness testing?

4 Daily inventory control ("tank sticking" or other) with tank tightness testing every two years.
3 Weekly inventory control ("tank sticking" or other) and occasional tank tightness testing.
2 Occasional inventory control ("tank sticking" or other).
1 No inventory control.

TANK CLOSURE (underground tank only)

If you have (or had) an abandoned underground tank on your property, what has been done with it?

4 Tank taken from ground by state-certified tank remover. Excavation checked for evidence of contamination.
3 ----------
2 Tank removed from ground by non-certified tank remover. Product was removed from abandoned tank and properly disposed of before removal. Efforts were made to appropriately remove tank to minimize damage to the environment and human health. Excavation checked for evidence of contamination. Local fire department was notified at least one month before tank was removed (Tank removal can result in an explosion/fire if not performed properly.)
1 Tank left in ground **OR** tank filled with inert material. (Filling the tank with an inert material, such as a sand slurry, may be a temporary solution to the problem, but will eventually result in groundwater contamination and be a liability to the property owner.)

SITE EVALUATION

What type of soil is on your property?

4 Fine-textured or "heavy" soils (clays).
3 Medium-textured soils (silt loam).
2 Medium- to coarse-textured soils (loam, sandy loam).
1 Coarse-textured soils (sands).

After a 1-inch rain in April, how long do you (or farmers in your area) have to wait to get into the field?

4 More than four days.
3 Four days.
2 Three days.
1 Zero to two days.

How sensitive is your region of the state to groundwater contamination (see map at end of publication)?

4 Low sensitivity.
3 Moderate sensitivity.
2 High sensitivity.
1 Very high sensitivity.

Does your property lie above or near any active/abandoned underground coal mines?

4 No underground mining is being done below or near your property.
3 Underground mining is currently being done.
2 An underground mine was abandoned underneath or near your property more than ten years ago.
1 An underground mine was abandoned underneath or near your property more than twenty years ago.

If your property does lie above or near any active/abandoned underground coal mines, what type of mine is it, and how deep is the mine? (See Part II for more information.)

4 No underground mining is being done below or near your property.
3 Underground mine is more than 400 feet deep.
2 Underground mine is 200 to 400 feet deep.
1 Underground mine is less than 200 feet deep. Mine is a "longwall" type mine.

What do I do with these rankings?

Take a look at your rankings for the individual questions you answered.

For Questions Where You Received A:	The Risk of Contaminating Groundwater Is:
4	Low
3	Low to Moderate
2	Moderate to High
1	High

Use this table to list any questions from Part I where you received a "1" (high risk activity or structure), or that were identified as being against Kentucky regulations. Next, write down the first step that can be taken to better the situation. Then read Part II of this publication, "Reducing the Risk of Groundwater Contamination by Improving Petroleum Product Storage." This will help you to improve any problem areas (1's or 2's) which were identified.

Activity or structure identified as high risk ("1")	**What is the first step that can be taken to solve the problem?**
Example: no inventory control used for fuel storage tanks.	*Begin to check the inventory of tanks on a daily basis.*

Part II. *Reducing* the Risk of Groundwater Contamination by Improving Petroleum Product Storage

STORAGE TANK TYPE, LOCATION, AND REGULATION REQUIREMENTS

A very important aspect of your liquid petroleum storage tank location is how close it is to any well, spring, cistern, sinkhole, or other water resource. Petroleum tanks should be located as far as possible from these areas **(at least 150 feet).**

The farther a tank is from any well, spring, cistern, sinkhole, or other water resource, the better. Although keeping the tank far from these areas is very important and always recommended, you must also consider the type of soil and geology that is on your property. More than 50 percent of Kentucky has areas with sinkholes, caves, and "sinking" or "losing" streams. These areas are called karst and are especially sensitive to groundwater contamination because the sinkholes, caves, or other cracks in the bedrock may serve as a direct route from potential pollution sources to the groundwater. In a karst area, keeping petroleum storage tanks away from any well, spring, sinkhole, or other water resource is not enough to prevent potential contamination of the groundwater. In karst areas, proper management of your petroleum products and storage tanks is extremely important. If you live in an area that is considered karst (sinkholes, caves, "sinking" or "losing" streams, etc.), you need to pay especially close attention to the storage and handling of your petroleum products. If you are not careful, you will risk contaminating the groundwater that serves as drinking water for many families. See the end of Part II ("A FEW WORDS ABOUT YOUR SITE") for more information about your site's ability to protect the groundwater.

If you have an aboveground tank, follow existing regulations for underground storage tanks as a guide. To protect against explosion and fire, do not locate tanks (especially aboveground tanks) closer than 40 feet to existing buildings. Previous regulations for siting aboveground storage tanks were concerned more with the explosion potential of tanks than the groundwater pollution potential. State agencies have revised aboveground storage tank regulations to better protect groundwater.

New storage tank location

Along with maintaining adequate distance from any well, spring, cistern, sinkhole, or other water resources, choose a location for a new tank based on the following considerations:

Soil characteristics. Highly corrosive clays, wet soils, cinders, and acid (low pH) soils can significantly speed up the rate of corrosion of underground metal tanks,

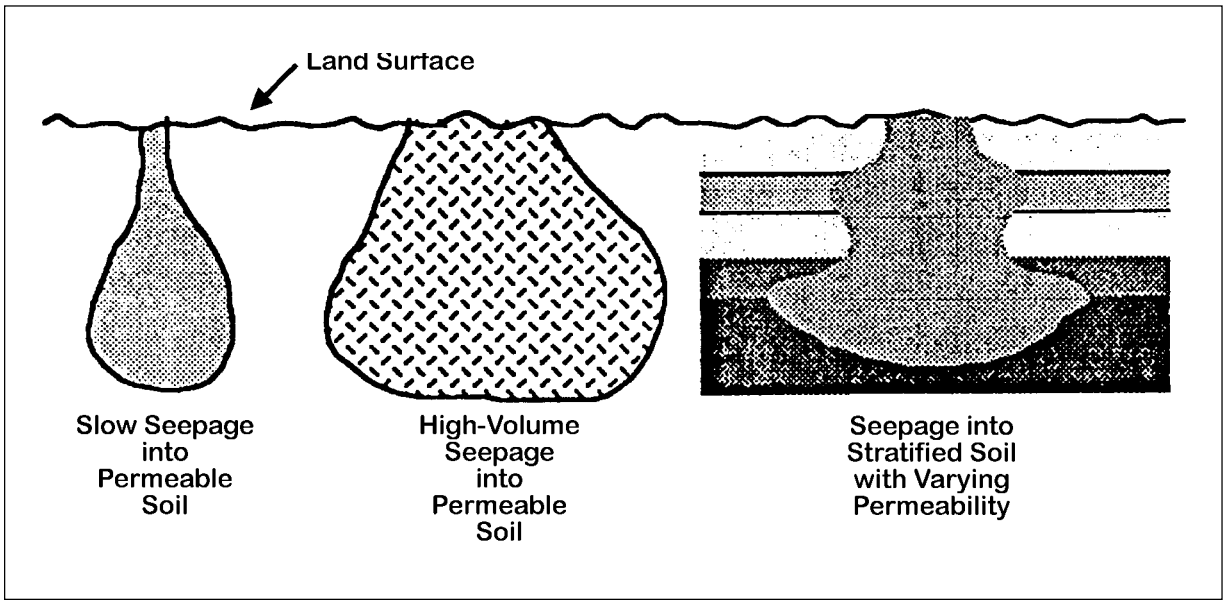

Figure 1. Petroleum product seepage into soils. *Source: Underground Tank Corrective Action Technologies, EPA/625-6-87, Jan. 1987.*

piping and those portions of aboveground tank systems in contact with these soils. Using clean backfill (sand and pearock) during installation can decrease the negative effects of surrounding soils.

Soil stability. Assess the ability of the underlying soil to support both underground and aboveground tanks. For special tank locations, such as hillsides or in areas of shallow groundwater, be sure to properly anchor and hold tanks in place. Be sure that pipes cannot twist or break if the tank is bumped or disturbed.

Regardless of soil conditions, locate aboveground tanks over an impermeable liner made of concrete, compacted clay, or one of the newer synthetic fabrics. Build a collection device for spills.

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 new tank.

Traffic. Assess traffic patterns around the tank. Determine whether the location of the tank or dispenser will block movement of any 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 any vehicles.

Depth to groundwater. Floodways or areas where the water table is close to the surface are poor locations for storage tanks. Tanks placed in such areas require special installation. To reduce pollution potential, an aboveground tank may be preferable to an underground tank.

Geology. As mentioned above, areas with many sinkholes, caves, or "sinking" or "losing" streams (karst areas) are especially vulnerable to groundwater contamination. Be sure to locate any tanks far from any sinkholes, wells, springs, or other water resources. Once again, it may be preferable to use an aboveground tank in place of an underground tank.

TANK DESIGN AND INSTALLATION

Whenever you install a 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.

Underground tanks

Federal law requires that all new underground farm petroleum storage tanks and related piping designed to hold 1,100 gallons or more must be constructed of nonmetallic materials such as fiberglass, have corrosion protection, or be equipped with an interior liner. A common method of corrosion protection includes the use of "sacrificial anodes."

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 for up to 30 years.

Interior liners are made of noncorrosive, synthetic materials and also can be effective in preventing releases of petroleum into the environment.

Another form of corrosion protection is to paint the tank or coat it with asphalt.

Regulations also require that new underground tanks designed to hold 1,100 gallons or more have spill, leak, and overfill protection. Spill protection typically consists of a catch basin for collecting spills when the tank is filled. Overfill protection is a close-to-full warning system or an overfill automatic shutoff. Leak detection can be an automated electronic detection system or a inventory reconciliation procedure ("tank sticking") that will let you know if the tank is leaking. Spill and overfill protection are important because they can prevent a number of small releases over a long period of time from polluting the groundwater. Leak detection is useful for quickly discovering failures of the tank system.

Aboveground tanks

State regulations for aboveground tank installation seek to reduce the potential for both pollution and fire. To decrease pollution potential, place tanks within a secondary containment structure consisting of a dike and a pad. If you can't construct a dike and a pad, try to place the tank on a concrete pad with curbs to help prevent spills and leaks from being released into the environment. Piping should be made of steel and painted to inhibit corrosion. Tanks should also be surrounded by a non-combustible building or fence (locked) to provide collision protection.

MONITORING

Regulations for new underground tanks with a capacity greater than 1,100 gallons on homes or farms will require that all tanks have a method of detecting leaks. Even if your tank(s) holds fewer than 1,100 gallons, you should use some sort of leak detection.

The first step in preventing leaks is to select the tank location carefully and ensure the proper installation and reliability of the leak detection selected.

Leak detection refers to two different things. First, it refers to a test that can be done on your tank using specialized equipment to make sure it is sealed tight and not

leaking fuel. This process is called tank tightness testing and should be done every couple of years if at all possible. Tank tightness testing can be expensive, but would be well worth its cost when considering the potential costs of a cleanup from a leaking tank. Methods to test the tightness of the tank include precision testing, tightness testing, and volumetric analysis. Air pressure testing is generally prohibited if a tank has ever contained product. Contact your tank supplier to get a recommendation on someone who could perform a tank tightness test.

Second, leak detection is something you can do to keep a close eye on the amount of fuel in the tank and make sure that none is leaking out to the soil or groundwater. The cheapest and easiest way to do this is to measure your tank inventory using daily "tank sticking." This method helps to find leaks when there is a decrease in the fuel level over a period of time when no fuel has been pumped out. This method will not detect very small leaks, but will provide a warning that further investigation is required. Contact the Kentucky Division of Waste Management Underground Storage Tank Branch (502-564-6716) or the Regional Office of the Kentucky Division of Waste Management (check local listing) for information about the correct way to "tank stick."

Other ways to check your tank inventory include the use of groundwater monitoring wells, vapor monitoring, or automatic tank gauging. These methods are more expensive than "tank sticking," but would be worth the expense if you can afford them.

In addition to protecting the groundwater, leak detection will save you money by preventing unnecessary fuel losses. A tank which is leaking can end up as a serious financial liability down the road. It is important to be especially aware of the age of your tank as well as the need to establish a leak detection program.

Since most tanks used on home or farmsteads are bare metal, corrosion or piping problems will cause leaks sooner or later. If your tank is more than 20 years old, or if you don't know its age, make a special effort immediately to determine whether leaks exist.

The closer the tank is to any well, spring, cistern, sinkhole, or other water resource, the more important it is to ensure that an adequate leak detection system is in place.

If you find or suspect a leak or spill, state law (KRS 224.01-400 and 224.60-105) and regulations (401 KAR 42:060) require that you notify the Kentucky Department for Environmental Protection at 502-564-2380 or 1-800-928-2380. If you are unsure if the quantity spilled or leaked is reportable, call 502-564-2150 for information.

ABANDONED TANKS

Tanks no longer in use on your property are called abandoned. An abandoned tank will corrode and, if it still contains gas or oil, will likely contaminate the groundwater. These tanks pose a serious problem for the property owner. Leaving the tank in the ground puts the groundwater at risk and can become a very expensive liability for the property owner down the road. For this reason, it is very important to remove any abandoned tanks from your property. On the other hand, removal of abandoned tanks is a delicate process that should be handled by a state-certified tank remover and can be an expensive process.

Kentucky regulations state that tanks that hold less than 1,100 gallons do not need to be removed by a state-certified tank remover. *It is nonetheless highly recommended to use a state-certified tank remover because the removal of an abandoned tank presents a very serious threat to both human health and the environment. Improper removal could result in an explosion or the contamination of soil and water.* This would then become a liability to the property owner. A list of state-certified tank removers is available from the State Fire Marshall's office (502-564-3626).

If you do remove a tank on your own, do your best to find out the recommended way to remove it without damaging human health or the environment. Contact the Kentucky Division of Waste Management (502-564-6716), the State Fire Marshall's office (502-564-3626), or a state certified tank remover for advice on the best way to remove an abandoned tank. Also notify the local fire department before removing the tank. ***Improper removal could easily result in an explosion.*** Remove and properly dispose of any fuel left in the tank before its removal. Check for soil contamination after tank removal. If any soil is contaminated, hire an environmental consultant to properly remove the soil from the site. Even if the tank is a non-regulated tank, the property owner is responsible for any spills that may occur in the process of removing a tank. Cleanup of such a spill could be very expensive and could result in fines from the Kentucky Department of Environmental Protection. **It is highly recommended to pay a state-certified tank remover to remove any abandoned tanks.** The initial expense would be well worth it when considering the risk to human health and the potential environmental liability.

In some cases, property owners have tried to deal with abandoned tanks by filling them with an inert material, such as a sand slurry. Although this may offer a temporary solution to the problem, it will make it harder to remove the tank in the future.

Underground storage tanks that hold 1,100 gallons or more must be registered with the Kentucky Division of Waste Management, Underground Storage Tank Branch. These tanks must be removed by a state-certified tank remover. The property owner must notify the Regional Office of the Kentucky Division of Waste Management before the tank is removed. Any questions can be directed to the Underground Storage Tank Branch at 1-800-928-4273.

It is very important to take some action toward the removal of abandoned tanks. Lenders and buyers are now requiring environmental audits, and it is likely that you will be unable to mortgage or sell property with an abandoned underground tank on it. If there is groundwater pollution in your area, your neighbors probably will suspect the tank is the cause. The Kentucky Department of Environmental Protection has regulatory authority to investigate potential pollution situations and recover costs from responsible parties. Document the steps you have taken to properly abandon your tank so that you are protected from legal action in the event of groundwater problems.

A FEW WORDS ABOUT YOUR SITE

The way home or farmstead practices such as petroleum product storage affect the groundwater depends in part on the type of soil and bedrock that is on your property.

How do soils affect the potential for groundwater contamination?

Soil characteristics are important in determining whether a contaminant breaks down to harmless compounds or leaches into groundwater. In general, the soil on your property may act as a filter that prevents contaminants from reaching the groundwater. Different soils have different abilities to "filter" contaminants. Areas with soils that let water flow through them quickly have a greater risk of groundwater contamination. This is because the soil doesn't get a long enough chance to absorb or "grip" the contaminant, and it may flow to the groundwater with leaching rainwater. On the other hand, soils that allow water to flow through slowly will do a better job of protecting the groundwater, but pose a higher risk of contaminating streams because the water will run off and may carry pollutants with it.

Sandy soils have large spaces between individual particles and therefore let water pass through quickly. Contaminants from your property can flow with this water. Because of this, sandy soils have a greater potential to pollute groundwater than clays.

Clay soils, on the other hand, have smaller spaces between individual particles and therefore water passes through slowly. Slower-moving water allows contaminants a greater chance to be absorbed by or "grip" onto the soil. Because of this, clays do a better job of protecting the groundwater. Since water moves through a clay soil slowly, there is a higher chance of runoff. This can result in surface water (stream) contamination. In other words, there is a tradeoff between groundwater and surface water protection. If your site has a clay soil, it will do a better job of protecting the groundwater, but you must also look out for surface water contamination.

In Kentucky, the type of bedrock on your property is more important than the type of soil in determining your site's ability to protect the groundwater.

How does the bedrock on your site affect the potential for groundwater contamination?

Bedrock is the rock that lies underneath the soil on your property. Like the soil, different types of bedrock have different abilities to protect (or not protect) the groundwater from pollution. Knowing the bedrock which underlies your property is therefore important because it can tell you if you live in an area that is sensitive to groundwater contamination. Earlier in this publication the sensitivity of karst areas to groundwater contamination was discussed. These areas are especially sensitive to groundwater contamination because the bedrock is dissolved by water, and large conduits and caves are formed underground. These conduits and caves allow pollution to flow very quickly from the surface to the groundwater. Basically, karst areas may act like a sewer system which connects your home or farmstead to the groundwater. Look at the map at the end of this publication to see if you live in a region of the state which has a low, medium, high, or very high sensitivity of groundwater contamination. If you live in an area which has a high or very high sensitivity (karst areas), you need to be especially careful with how you manage your home or farmstead pollution sources. This means being very careful around sinkholes and other water resources (wells, springs, streams, etc.). **Do not dump garbage into sinkholes, or you will contaminate the groundwater that serves as drinking water for many families.**

Potential effects of underground mining

Underground coal mining done underneath or near your property may result in the subsidence, or settling, of your property. This settling may cause damage to structures as well as put groundwater at risk of being contaminated. The settling causes cracks in the land that can then allow pollution from the soil surface to enter the groundwater. The chance of subsidence occurring on your property depends on when the underground min-

ing occurred, the depth of the mine, and what type of mining was done.

Depending on the type of underground mining done, different precautions are taken by mining companies to prevent subsidence. "Room and pillar" mining leaves pillars in the mines that support the land above when the mine is abandoned. As time passes, there is a greater risk that these pillars can degrade and result in the subsidence, or settling, of the land above. Certain types of "longwall" mines do not provide pillars. Therefore, these mines have a greater chance of resulting in subsidence. The depth of the mining also affects the chance that subsidence will occur. Deeper mines (greater than 400 feet) are less likely to cause subsidence than shallow mines (less than 200 feet). Information regarding the type and depth of underground coal mines may be obtained from the Department of Mines and Minerals at 606-254-0367 (ask for the Map Room). Be prepared to describe the location of your property in as much detail as possible (use a topographical map if possible).

GLOSSARY

Petroleum product storage

These terms may help you make a more accurate assessment when completing Part I of this publication. They may also help clarify some of the terms used in Part II.

Cathodic protection: One of several techniques to prevent corrosion of a metal surface by reversing the electric current that causes corrosion. A tank system can be protected by sacrificial anodes or impressed current. (See **sacrificial anodes** and **impressed current.**)

Corrosion: Deterioration of a metallic material due to a reaction with its environment. Damage to tanks by corrosion 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 connection link that allows weak electrical currents to flow. Then, the negatively charged part of the underground tank system – where the current exits from the tank or its piping – begins to deteriorate. As electric current passes through this part, the hard metal begins to turn into soft ore, holes form, and leaks begin.

Corrosion protector: A method or device that limits, reduces or eliminates corrosion. One method of corrosion protection is **cathodic protection**. Steel tanks can be protected by coating them with a corrosion-resistant coating combined with "cathodic" protection. Steel underground tanks can also 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 and piping made completely of noncorrosive material, such as fiberglass.

Galvanized: The result of coating an iron or steel structure with zinc. Galvanized materials do not meet corrosion protection requirements.

Impressed current: A protection system which introduces an electric current into the ground through a series of anodes that are not attached to the underground tank. Because the electric current flowing from these anodes to the tank system is greater than the corrosive current attempting to flow from it, the underground tank is protected from corrosion.

Interior liner: A liner used inside petroleum storage tanks made of a noncorrosive, synthetic material that protects metal tanks from corrosion.

Inventory control: Measuring and comparing the volume of tank contents regularly with product delivery and withdrawal records to help detect leaks before major problems develop.

Sacrificial anodes: Pieces of metal attached directly to an underground tank that are more electrically active than the steel tank. Because the anodes are more active, electric current runs from the anodes rather than from the tank. The tank becomes the cathode (positive electrode) and is protected from corrosion. The attached anode (negative electrode) is "sacrificed," or consumed, in the corrosion process.

Secondary containment: A system such as a sealed basin and dike that will catch and hold the contents of a tank if it leaks or ruptures.

Soil permeability: The quality that enables soil to transmit water or air. Slowly permeable soils have fine-textured materials like clays that permit only slow water movement. Moderately or highly permeable soils have coarse-textured material like sands that permit rapid water movement.

Spill and overfill protection: Spill protection usually consists of a catch basin for collecting spills when the tank is filled. Overfill protection is a warning or prevention of an overfill, such as an automatic shutoff or buzzer.

These precautions can prevent a number of small releases over a very long period of time from polluting the groundwater.

Tank tightness testing: A procedure for testing a tank's ability to prevent accidental release of any stored substance into the environment or intrusion of groundwater into an underground tank.

CONTACTS AND REFERENCES

Who to call about...

Petroleum tank leaks and spills

Ky. Dept. for Environmental Protection
(Emergency Response Team) 502-564-2380
(for emergency)
1-800-928-2380
(for emergency)

Ky. Division of Waste Management
(Underground Storage Tank Branch) 502-564-6716

State Fire Marshall's Office 502-564-3626

U.S. EPA Underground Storage
Tank coordinator 312-886-6159

RCRA Superfund Underground Storage
Tank Hotline 1-800-424-9346

What is KY•A•Syst?

KY•A•Syst is a series of publications which will help you assess *and improve* how effectively your home or farmstead practices protect the groundwater. The publications ask you about your home or farmstead structures and activities. Your answers will help you see how your practices might be affecting the groundwater. Each publication then gives suggestions about things you can do to improve your home or farmstead practices to better protect the groundwater.

The topics of the program include:

- Drinking Water Well Condition
- Agricultural Chemical Storage and Handling
- Petroleum Product Storage
- Household Waste Management
- Household Wastewater Treatment
- Livestock Waste Storage
- Livestock Yards Management
- Silage Storage
- Milking Center Wastewater Treatment

Some of these topics apply only to people who have farms, and others apply to both farm owners and non-farm owners. ***This program is a completely voluntary program: it is an assessment you can perform in the privacy of your own home. No information from the publications needs to leave your home. The goal of KY•A•Syst is to help you protect the groundwater that supplies drinking water for many families.***

Edited and compiled by Mark Dravillas, former Extension Associate for Water Quality, and Tom Ilvento, former Associate Extension Professor in Sociology, University of Kentucky Cooperative Extension Service. Based on materials from the National Farm•A•Syst Program, University of Wisconsin (author: Pat Walsh, University of Wisconsin). Special thanks to the Kentucky Cabinet for Natural Resources and Environmental Protection, Division of Waste Management, and the Fayette Urban County Government, Division of Environmental and Emergency Management, for technical review and comments.

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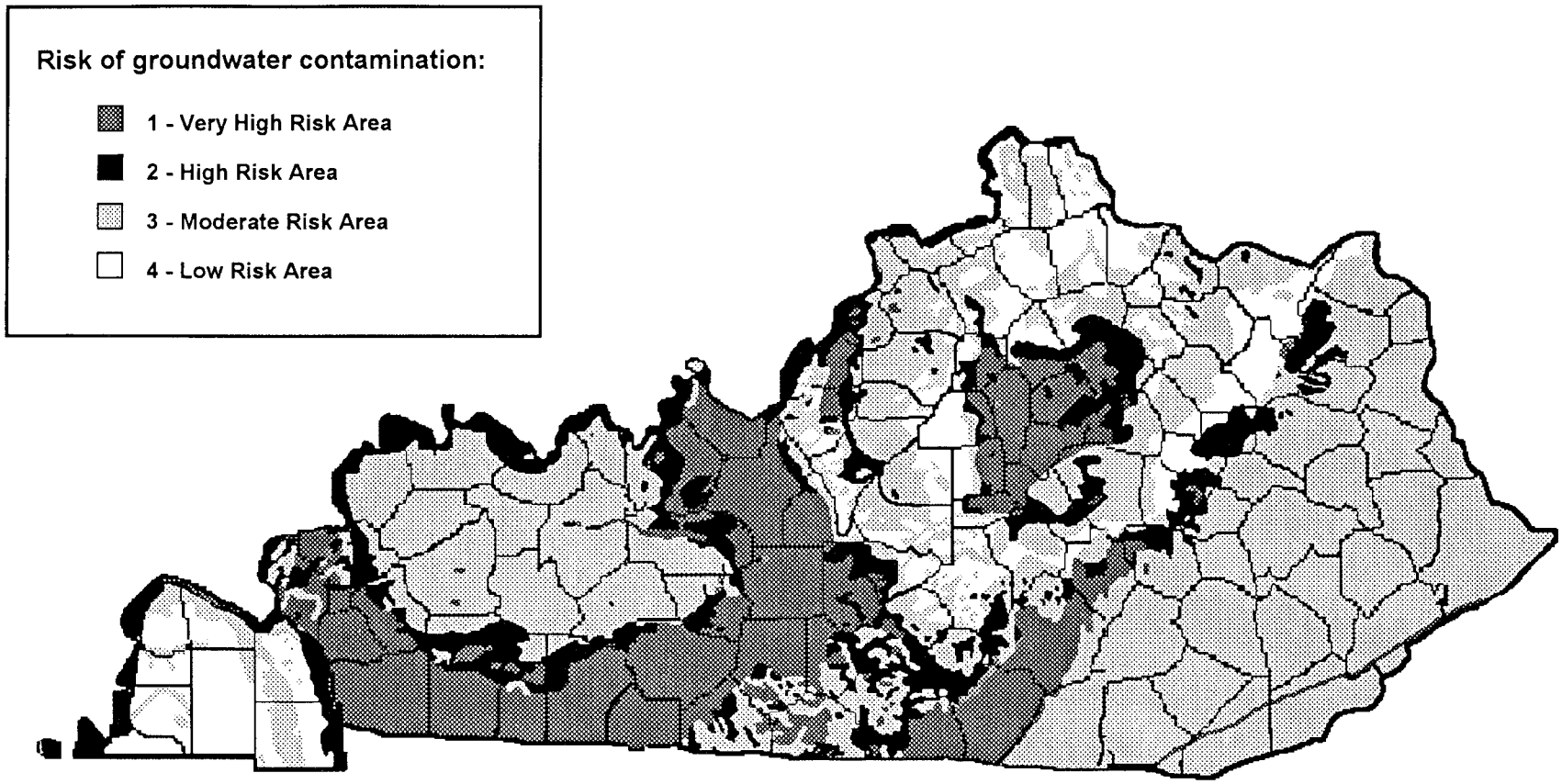
The KY•A•Syst project is coordinated by the Kentucky Cooperative Extension Service in collaboration with various Kentucky state and federal organizations and agricultural commodity and environmental groups.

KY•A•Syst publications can be obtained at your county Cooperative Extension Service office. For additional information on the KY•A•Syst program, contact Marla Barnett at (606) 257-2735 or Dr. Curtis W. Absher at (606) 257-1846.

Groundwater Sensitivity Map



Reproduced from a map created by Division of Water - Groundwater Branch : Frankfort, Ky.

This map shows the potential for groundwater contamination in the different areas of Kentucky. Find the county you live in to determine how sensitive your region is to groundwater contamination.