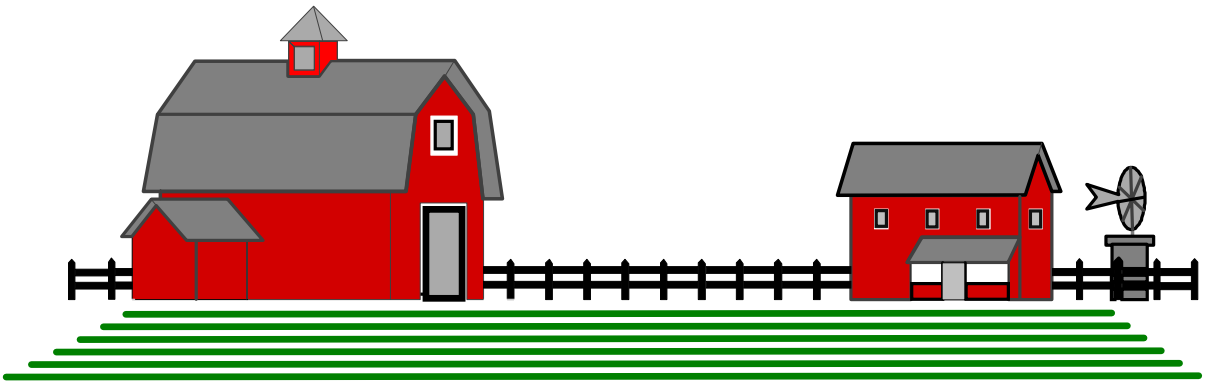
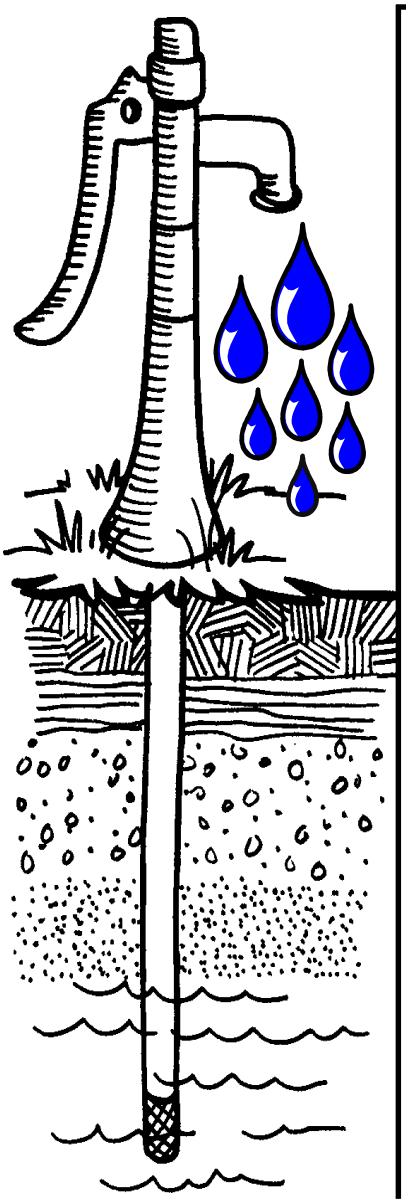




Protecting Your Water Quality Through a Farm & Home Assessment

A Partnership Program for Voluntary Pollution Prevention

USDA Natural Resource Conservation Service

USDA Cooperative State Research, Education and Extension Service

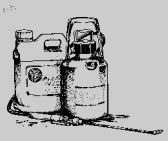
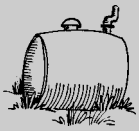
US Environmental Protection Agency

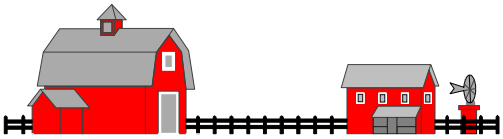
Table of Contents









Farm & Home Water Quality Assessment

Protecting Your Water Quality Through a Farm & Home Assessment

Why should you be concerned?

About 95 percent of the families who live in the country get water from ground water or a rain water collection system (cistern) to supply their drinking water needs. These systems can be very safe when they are designed to provide clean, safe water. If the water supply equipment or storage facilities are not properly constructed and/or maintained, they can allow bacteria, pesticides, fertilizer, animal manure, petroleum products, or other pollutants to contaminate drinking water. These contaminants can put your family's health at risk.

Pollution is a serious threat to available fresh water supplies which only make up less than one half of one percent of the world's total water supply. You can help protect your drinking water supplies by learning to recognize potential sources of pollution and by working to reduce or eliminate them.

What can you do?

This assessment has been designed to make you aware of conditions or practices on your property that increase the risk of contamination to your drinking water. It is divided into eight sections so you can easily identify particular situations on your property that may be putting your drinking water at risk.

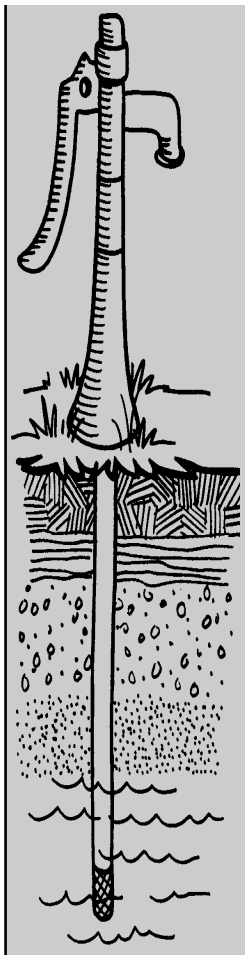
If you answer ***Yes*** *or* ***do not know*** the answer to any of the questions in a specific section, you will be directed to a chapter in this workbook that will provide more information on that topic. Each chapter is followed by a worksheet that will help you to develop an Action Plan to establish practices that reduce the risks of contamination to your drinking water supply.

A Partnership Program for Voluntary Pollution Prevention

USDA Natural Resource Conservation Service

USDA Cooperative State Research, Education and Extension Service

US Environmental Protection Agency



I. Assessing the Condition and Location of Your Water Supply System

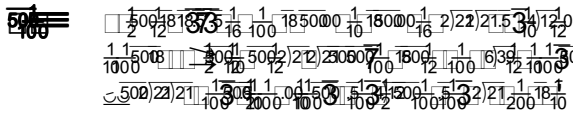
A. Well Water Supply System

Does your drinking water come from a well? ***If yes, continue to the questions below.***

Does your drinking water come from a Rainwater Collection System or is your drinking water stored in a cistern for storage? ***If Yes, then go to Section B. Rainwater Collection Systems.***

Does your drinking water comes from a Public Water Supply? ***If Yes, then continue to Section II. Assessing Your Site.***

YES	NO	
☐	☐	1. Do you have a well less than 50 feet deep?
☐	☐	2. Do you have a dug well or driven well, rather than a drilled well?
☐	☐	3. Was your well built more than 50 years ago?
☐	☐	4. Has it been longer than three years since you had your well water tested or did your water test positive for nitrates and/ or bacteria the last time it was tested?
☐	☐	5. Does your well casing (well pipe) extend less than 12 inches above the ground level?
☐	☐	6. Is there a depression around your well casing?
☐	☐	7. Can you see any cracks or holes in your well casing?
☐	☐	8. Is your well located downhill from any potential contamination sources (bacteria, pesticides, fertilizer, animal manure, petroleum products, or other pollutants)?
☐	☐	9. Is your well located closer to potential pollution sources than the local code allows?
☐	☐	10. Are there abandoned wells on your property that have not been properly plugged?



If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing the Condition and Location of Your Drinking Water Well*. This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.

B. Rain Water Collection System (Cistern)

Does your drinking water supply come from a rain water collection system (cistern)? If yes, continue with questions below. If no, continue to Section II. Assessing Your Site.

YES	NO		
☐	☐	1.	Has it been longer than three years since your cistern was emptied and cleaned?
☐	☐	2.	Has it been longer than four months since you treated your cistern with chlorine?
☐	☐	3.	Is there debris on your roof or in your rainwater collection system (drains, pipes, cistern)?
☐	☐	4.	Is your roof made or coated with toxic materials (i.e., asbestos, lead paint, zinc, etc.)?
☐	☐	5.	Are there places on your roof, collection area, or in your gutter system where water stands instead of flowing into your cistern?
☐	☐	6.	Can animals or debris enter through the screen(s) on your rainwater collection system?
☐	☐	7.	Has it been longer than 2 years since you inspected your cistern for cracks or leaks?

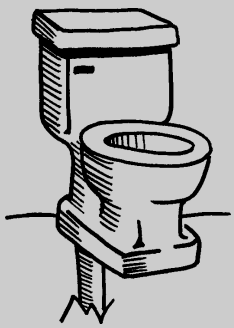
If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing the Condition and Location of Your Rain Water Collection System (Cistern).* This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.

II. Assessing Your Site

YES NO

- ☐ ☐ 1. Has it been longer than five years since you updated or reviewed your resource conservation plan?
- ☐ ☐ 2. Is your soil sandy or gravelly (does your soil drain quickly)?
- ☐ ☐ 3. Is your soil less than three feet deep (to bedrock or caliche)?
- ☐ ☐ 4. Is your water table less than ten feet from the soil surface ?
- ☐ ☐ 5. Do you have problems with soil erosion on your property?
- ☐ ☐ 6. Does runoff from your property reach surface waters?

If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing Your Site*. This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.



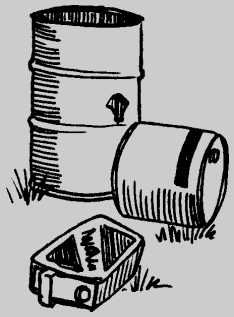
III. Assessing Your Household Waste Water Disposal System

YES NO

- ☐ ☐ 1. Do you have an on-site waste water disposal system (septic tank and drain field, seepage pit, or cesspool)?
- ☐ ☐ 2. Is your on-site waste water disposal system less than 50 feet from any water supply system (well, cistern, etc.)?
- ☐ ☐ 3. Is your on-site waste water disposal system less than 100 feet from a water body (streams, lakes, coastal waters, etc.)?
- ☐ ☐ 4. Has it been longer than three years since you had your septic tank cleaned out?
- ☐ ☐ 5. Do you dump grease, oil, or leftover household chemicals down your drain?

If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing Your Household Waste Water Disposal System.* This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.

IV. Assessing Your Household Hazardous Waste Management Practices

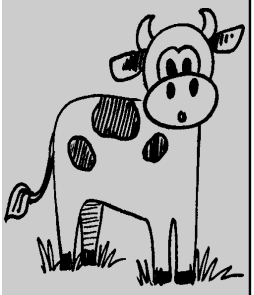


YES NO

- ☐ ☐ 1. Do you dispose of household products such as furniture polish, paints, stains, and cleaners and/or their containers on your property?
- ☐ ☐ 2. Do you dispose of used petroleum products, antifreeze, or lead-acid batteries on your property?
- ☐ ☐ 3. Do you dispose of leftover or banned pesticides and/or pesticide containers on your property?
- ☐ ☐ 4. Are any of these hazardous products mentioned in the first three questions accessible to children and pets?
- ☐ ☐ 5. Do you need a plan to handle spills of hazardous products?

If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing Your Household Hazardous Waste Management Practices*. This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.

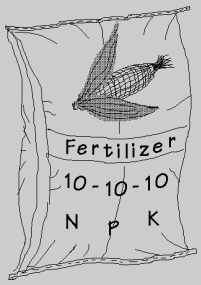
V. Assessing Your Livestock and Poultry Operations



YES NO

- ☐ ☐ 1. Do you have livestock and/or poultry on your property? If you answer No, continue to Section VI. Assessing Your Fertilizer Storage and Handling Practices.
- ☐ ☐ 2. Do you house livestock and/or poultry within 100 feet of a water supply system (well, cistern, etc.)?
- ☐ ☐ 3. Do you store manure within 250 feet of a water supply system (well, cistern, etc.)?
- ☐ ☐ 4. Is your livestock and/or poultry facility located uphill from a water supply system (well, cistern, etc.)?
- ☐ ☐ 5. Do you dispose of dead animals on your property?
- ☐ ☐ 6. Do you spread manure on your fields, lawns, and gardens without considering the amount of nutrients in the manure?

If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing Your Livestock and Poultry Operations*. This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.

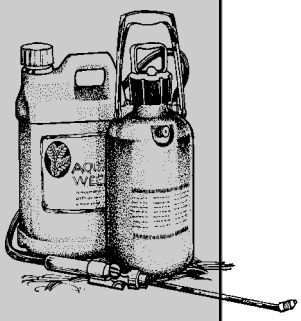


VI. Assessing Your Fertilizer Storage and Handling Practices

YES	NO		
☐	☐	1.	Has it been longer than three years since you had your soil tested (i.e., fields, lawns, and gardens)?
☐	☐	2.	Is your soil sandy or gravelly? (does your soil drain quickly)?
☐	☐	3.	Do you apply manure and/or crop residues to your fields, lawns, and gardens?
☐	☐	4.	Do you apply animal manure without knowing or testing it for nutrient content?
☐	☐	5.	Do you make fertilizer applications based on maximum crop yields rather than historical crop yields?
☐	☐	6.	Do you apply all the fertilizer needed for the whole growing season at the beginning of the season or all at one time?
☐	☐	7.	Do you store fertilizer products on your property?
☐	☐	8.	Has it been longer than one year since you updated your nutrient management plan?

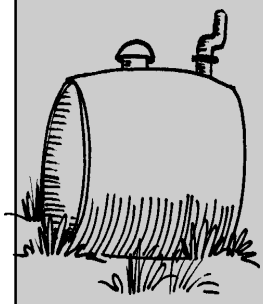
If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing Your Fertilizer Storage and Handling Practices*. This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.

VII. Assessing Your Pesticide Storage and Handling Practices



YES	NO		
☐	☐	1.	Do you use or store pesticides on your property? If No, continue to Section VIII. Assessing Your Petroleum Product Storage Facilities.
☐	☐	2.	Do you mix, apply or store pesticides without reading the label first?
☐	☐	3.	Are your pesticides stored on wood, gravel, soil, or on a concrete pad without a curb?
☐	☐	4.	Do you have pesticide containers that are damaged, leaking, and/or rusting?
☐	☐	5.	Do you mix, apply or store pesticides within 150 feet of any water supply system (well, cistern, etc.)?
☐	☐	6.	Do you fill your sprayer tank directly from a drinking water supply system?
☐	☐	7.	Do you fill your sprayer tank with a hose that does not have a check valve or put the hose in the tank so that it is below the water line during filling?
☐	☐	8.	Do you leave your sprayer tank unattended while filling?
☐	☐	9.	Do you rinse out your sprayer tank near your water supply system (well, cistern, etc.) or a water body?
☐	☐	10.	Do you apply pesticides without recalibrating your sprayer?
☐	☐	11.	Has it been longer than five years since you attended a pesticide applicator training/workshop?

If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing Your Pesticide Storage and Handling Practices.* This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.



VIII. Assessing Your Petroleum Product Storage Facilities

YES	NO		
☐	☐	1.	Do you have a petroleum storage tank(s) on your property?
☐	☐	2.	Is your petroleum storage tank less than 100 feet from a water supply?
☐	☐	3.	Is your storage tank underground?
☐	☐	4.	Do you lack protection against leaks or spills from your petroleum storage tank(s) (i.e., no catch basin or concrete spill pad)?
☐	☐	5.	Do you need to develop a method of record keeping to keep track of petroleum use?

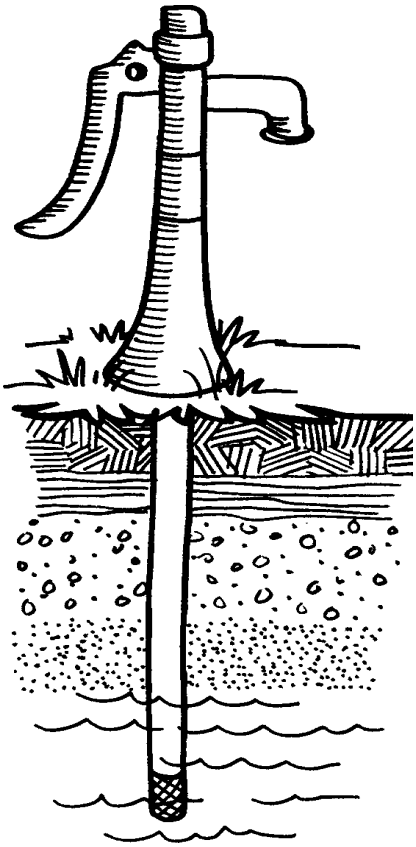
If you have answered Yes or do not know the answer to any of the questions in this section, refer to the chapter in this workbook titled, *Assessing Your Petroleum Product Storage Facilities*. This chapter will contain valuable information and it will help you develop an Action Plan to reduce the risk of contamination to your drinking water supply.

For more information

This assessment does not cover all potential risks on your property that could impact the quality of your drinking water. It is designed to: create an awareness of potential risks to water quality on your property; provide voluntary solutions to reduce pollution risks; and develop an action plan to protect your drinking water supply. Individual areas and states may vary in requirements on minimum standards for water supply protection. Always check with your local offices listed in the reference section of each workbook before making changes to your water supply system. There are other, more detailed Farm*A*Syst / Home*A*Syst Programs available. If you have specific questions about protecting your drinking water, contact your local Extension Service Office, local USDA Natural Resource Conservation Service office, or your local Soil and Water Conservation District Office. You may also contact the National Farm*A*Syst / Home*A*Syst Office at BI42 Steenbock Library, 550 Babcock Drive, Madison, Wisconsin 53706-1293 Phone (608) 262-0024.

This document was produced by the National Farm*A*Syst / Home*A*Syst Staff: Doug Knox, Natural Resource Conservation Service Coordinator; Gary Jackson, Cooperative State Research, Education and Extension Service; James Hagengruber, University of Wisconsin; and Liz Nevers, National Outreach Specialist; in partnership with Javier Balli, EPA Extension Service Liaison EPA Region 6; Mario Morales, RC&D Coordinator, VI Resource Conservation & Development Council; Jose Pagan, Soil Conservationist, Natural Resources Conservation Service, Georgia; Gloriselle Negron Rios, Environmental Health Specialist, Universidad de Puerto Rico; Jose Martinez, Staff Resource Conservationist, Natural Resource Conservation Service, Caribbean Area; Julie Wright, Natural Resources Specialist, Cooperative Extension Service University of the Virgin Islands; John Nowatzki and Debbie Tanner, North Dakota State University Extension Service; and Virginia Prest and June Trimble, Washington State University Cooperative Extension. This model is patterned in a large part after the North Dakota Farm*A*Syst Program developed by North Dakota Extension Service and includes items from various other state Farm*A*Syst Programs.

The Farm*A*Syst / Home*A*Syst Program is funded nationally by: USDA Cooperative State Research Education and Extension Service, USDA Natural Resources Conservation Service, and the U.S. Environmental Protection Agency. The program supports voluntary pollution prevention to protect surface and ground water through a partnership with governmental agencies and the private sector.



Protecting Your Water Quality Through a Farm & Home Assessment

Assessing the Condition & Location of Your Drinking Water Well

Why should you be concerned?

The condition of your water supply system is an important factor to consider when looking at potential contamination of your drinking water. Specifically, you should be concerned about the location and condition of your well and the activities around your well that may affect the quality of your drinking water supply.

Some contaminants in water may only affect appearance, while others such as micro oganisms, nitrate, and toxic chemicals can be extremely harmful or even fatal. This worksheet contains a brief discussion about your water supply system. It will help you identify steps you can take to reduce the risk of contamination to your drinking water supply.

What can you do?

The information in this chapter will address potential contaminants to your drinking water supply, and assist you in taking voluntary action to protect your drinking water supply from contamination.

Use this chapter to address questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing the Condition and Location of Your Drinking Water Well** section in your "Farm & Home Water Quality Assessment." This chapter will help you develop an Action Plan to establish practices that reduce contamination risks to your drinking water supply.

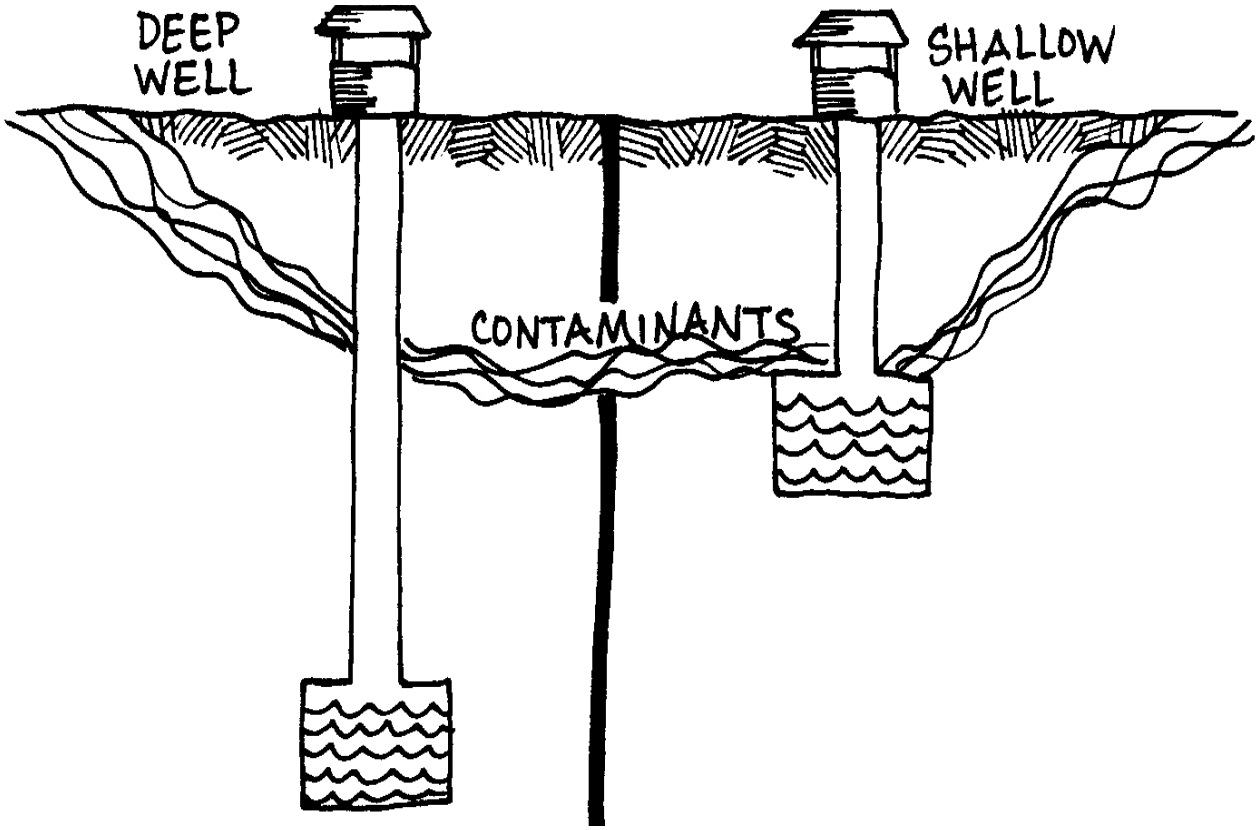
Note: *If your drinking water comes from a well and is pumped into a cistern for storage, you should look through the questions in Section B. Rainwater Collection Systems to identify potential hazards.*

Well Water Supply Systems

1 Do you have a well less than 50 feet deep?

The depth of your well is an important factor to consider when looking at the potential for ground water contamination. Contaminants that infiltrate from the surface are more likely to contaminate shallow uncased wells than deep wells with a properly installed casing.

Drilled wells with a properly installed casing are deeper than most dug or driven wells and have properly installed grout surrounding the casing to prevent contamination.



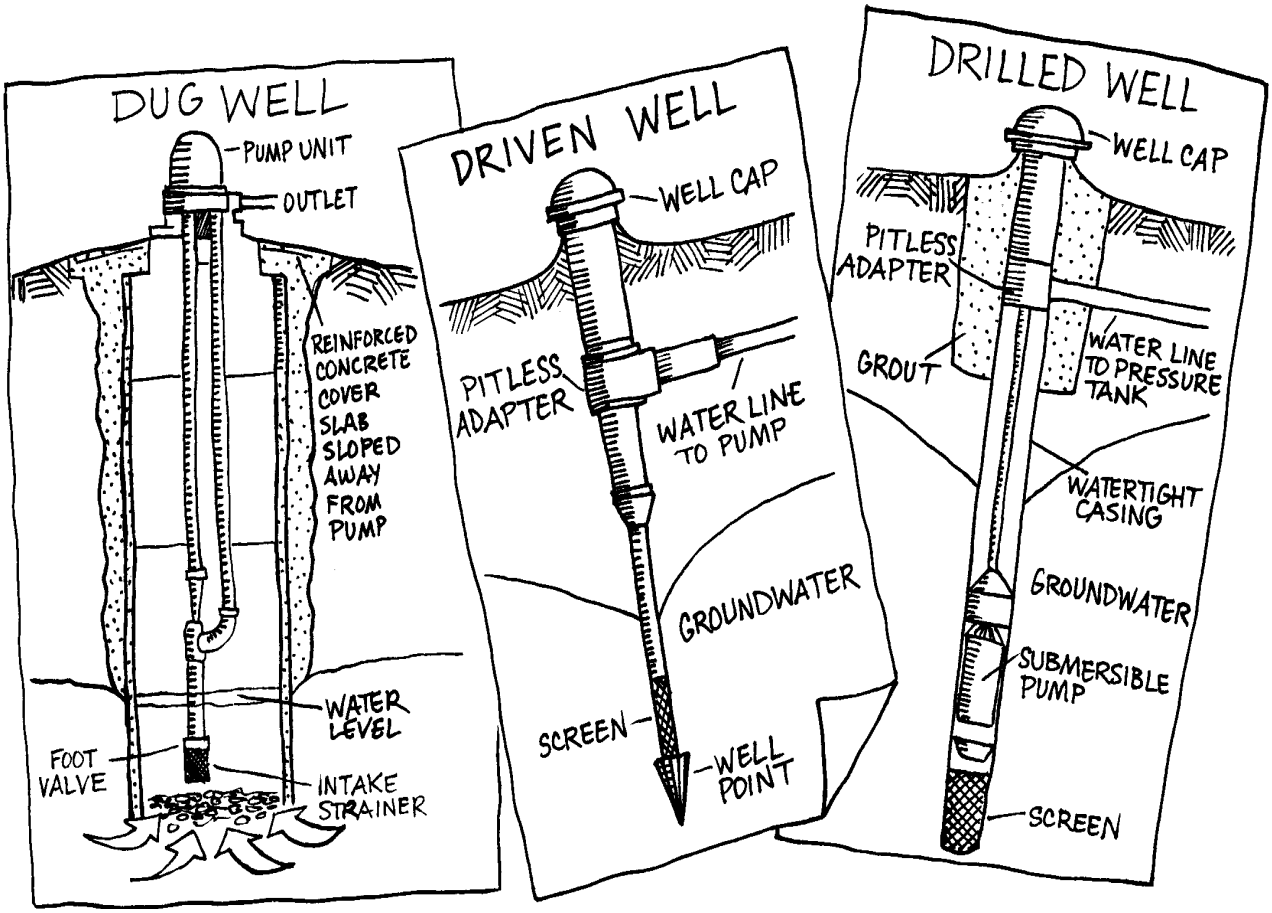
2 Do you have a dug well or driven well, rather than a drilled well?

There are three main types of wells: dug, driven and drilled wells.

A dug well is a large-diameter hole normally wider than three feet and is often constructed by hand. This type of well has the greatest risk of being contaminated because it is usually shallow and often poorly protected from surface water runoff.

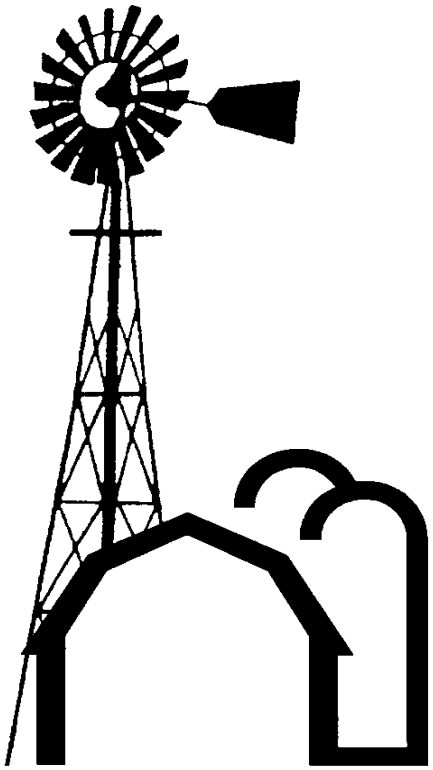
A driven well is usually two inches wide or less and typically installed only in areas of relatively loose materials such as sand. Because driven wells are usually shallow, less than 50 feet, the risk of contamination is high.

A drilled well that has a properly installed casing is usually the least susceptible to contamination and is usually the safest.



3 Was your well built more than 50 years ago?

The age of your well is also a factor to consider when determining the potential for ground water contamination. Older wells are generally shallow and more likely to be located in an area that may be downhill or close to potential sources of contaminants. These wells may have structural problems such as lack of adequate casing, or the casing may be corroded.

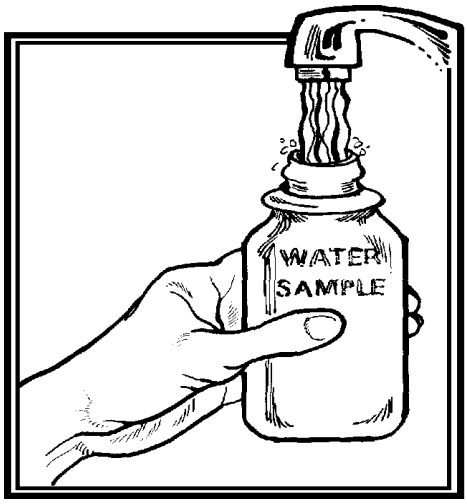


4 Has it been longer than three years since you had your well water tested or did your water test positive for nitrate and/or bacteria the last time it was tested?

As part of your well maintenance program, you should test your well water every year. Water testing is the only sure way to know what substances are present in your drinking water.

Some contaminants may only affect appearance, while others such as bacteria, nitrate and toxins can be extremely harmful or even fatal.

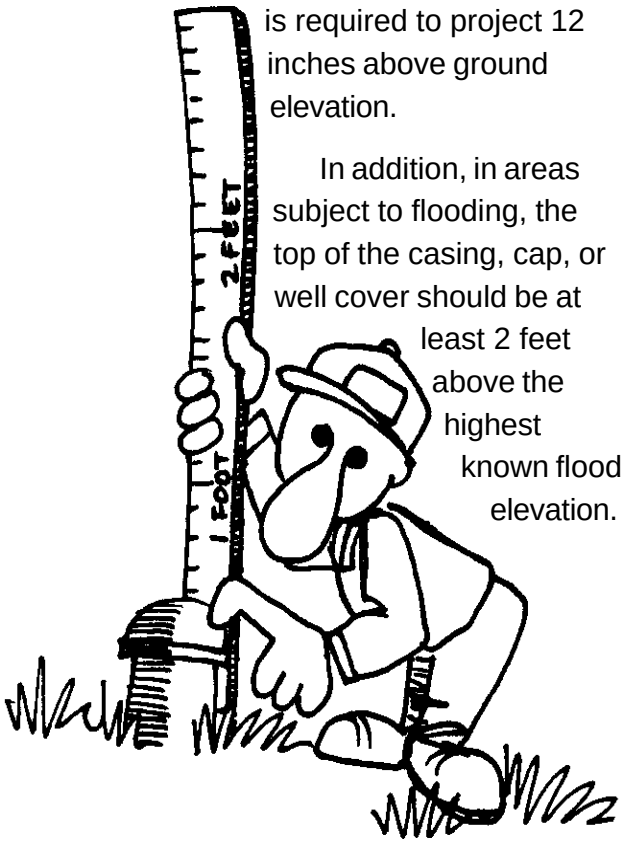
Consult your local health department or water quality agency to determine what you might want to test for, and how to take a water sample. If your sample is positive for bacteria and/or contains a high level of nitrate, consider testing for additional contaminants.



5 Does your well casing (well pipe) extend less than 12 inches above the ground level?

In looking at potential contamination, you need to consider casing height.

Currently, in most states, the well casing or cap (if the well has one) is required to project 12 inches above ground elevation.



In addition, in areas subject to flooding, the top of the casing, cap, or well cover should be at least 2 feet above the highest known flood elevation.

The area surrounding the well casing should also be sealed with clay soil or an impervious material. Surface water that enters a well casing can directly channel contaminants to your drinking water. In most states, the top of the well casing cannot end in basements, pits, or other spaces below ground level.

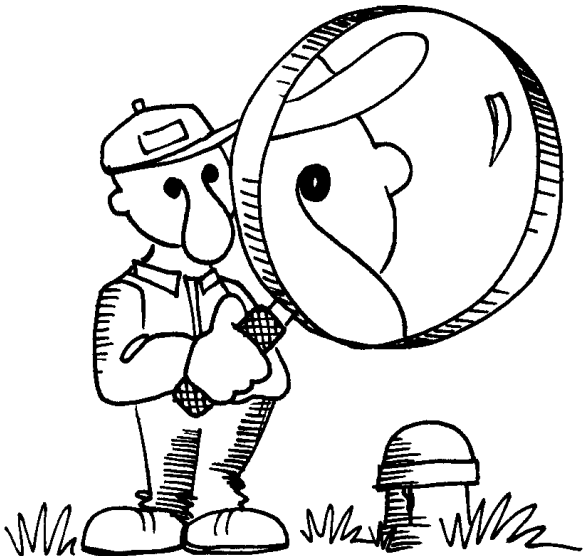
6 Is there depression around your well casing?

The direction of surface water flow can affect the risk of contamination to your drinking water supply. Potential pollution sources on your property should be located downhill from your well. If contaminants get into the surface water, they will likely flow away from the well.

If the surface of the ground around your well casing is lower than the surrounding landscape, it provides an area for surface water to collect. Contaminants can either leak down along the well casing or through cracks in the well casing.

7 Can you see any cracks or holes in your well casing?

The condition of the well casing and cap needs to be inspected periodically. Wells are commonly cased with steel, plastic or concrete to prevent the collapse of the borehole. The space between the casing and the sides of the borehole is filled with grout, cement, concrete, or bentonite, depending on the geological materials encountered. Both the casing and the grout prevent pollutants from seeping down into the well.

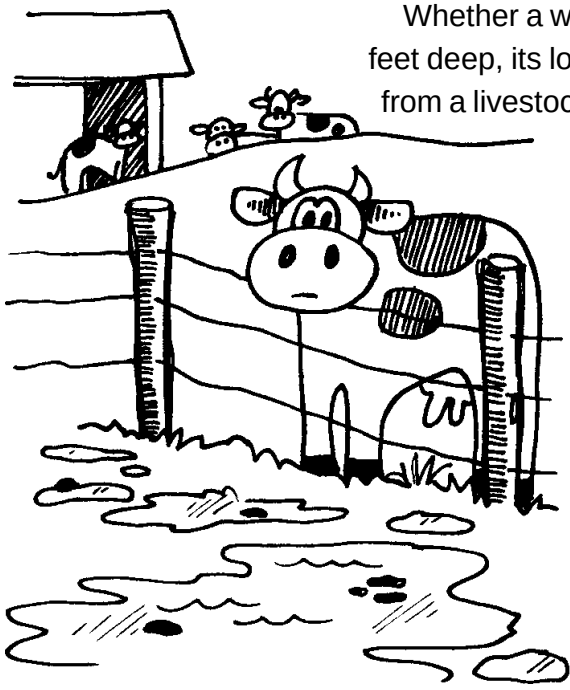


To prevent contaminants from flowing into the well casing, a tight fitting, vermin-proof cap must be installed on the well when it is constructed. The cap should have a screened vent that is turned downward so air can enter the well. The vent should be high enough so it will not allow surface water to enter the well. Not all wells are capped; some wells have pumps mounted on top of the casing.

It is possible for the well casing to corrode or crack and the well cap to become damaged. You should visually inspect the above-ground portion of your well for holes or cracks and make sure the cap is secure. You can also inspect the inside of the casing by removing the well cap and shining a light around the inside of the casing.

If you have a shallow well, you may also be able to determine the condition of your well casing. If you hear water running when the pump is not operating, there could be a crack or hole in the well casing.

8 Is your well located downhill from any potential contamination sources (bacteria, pesticides, fertilizer, animal manure, petroleum products, or other pollutants)?



Whether a well taps water just below ground or hundreds of feet deep, its location is a crucial safety factor. A well downhill from a livestock yard, a leaking petroleum storage tank or a failing septic system runs a much greater risk of contamination than a well on the uphill side of these pollution sources.

Surface slope does not always indicate the direction a pollutant might flow once it gets into the ground. In shallow aquifers, ground water flow is often in the same direction as the surface flow. If the aquifer supplying water to your well is deep below the surface, though, its slope may be different than that of the land surface.

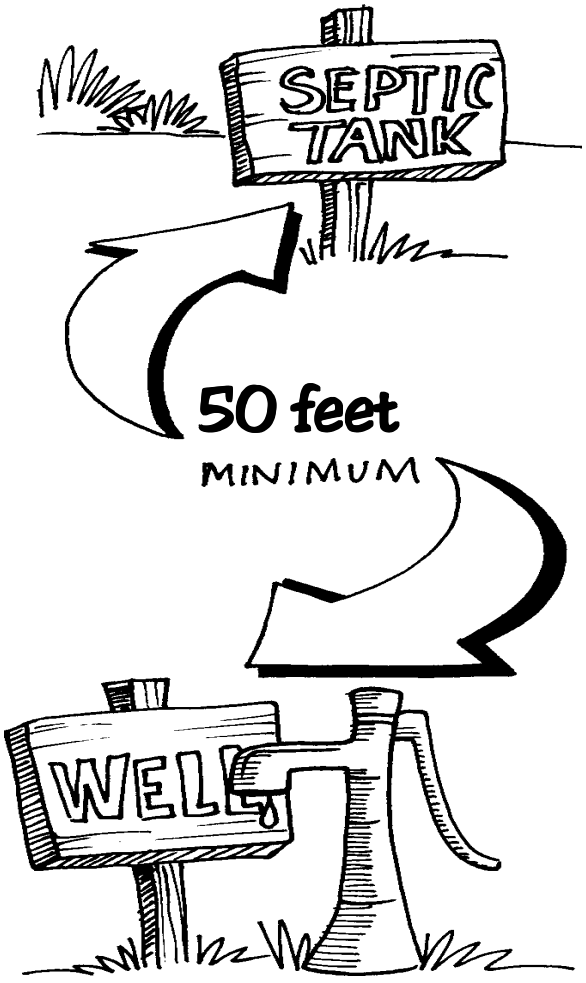
Locating the well in a safe place takes careful planning and consideration. Factors such as location to surface drainage and ground water flow are important. When planning for a new well, try to locate it up slope from potential contaminants. On existing wells that are down slope from contaminants, consider removing contaminant sources or diverting surface water runoff away from the well.

9 Is your well located closer to potential pollution sources than the local code allows?

Besides being uphill from potential pollution sources, your well should meet minimum separation distances from potential pollution sources.

Most states have regulations listing minimum distances. For example, your septic system should be at least 50 feet from your drinking water supply. Minimum separation distances are required but greater distances are better.

If you do not know these distances, contact your local health department.

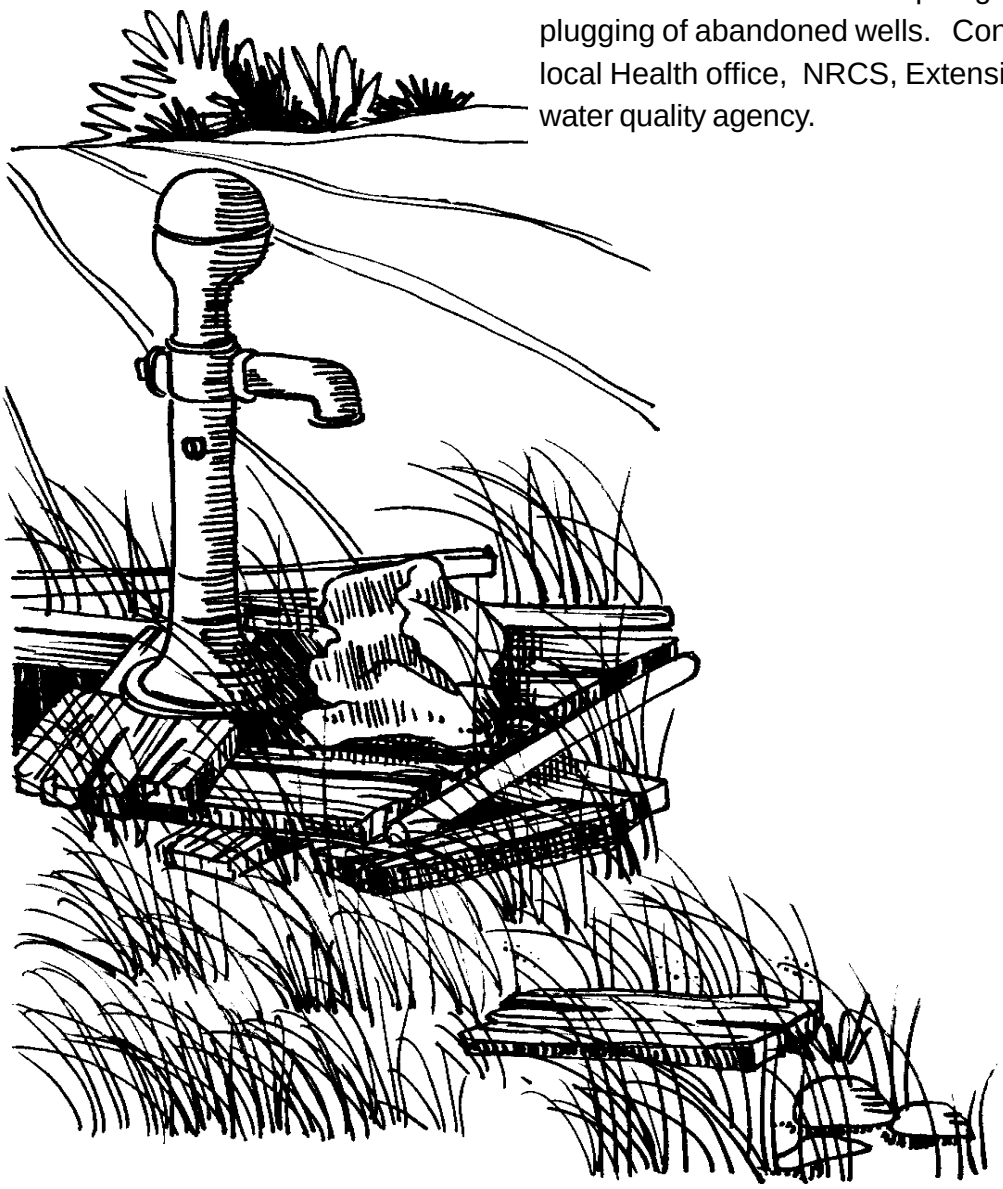


10 Are there abandoned wells on your property that have not yet been properly plugged?

Abandoned wells are a hazard and a direct pathway for contaminants to enter the ground water.

When you plug an abandoned well on your property, local guidelines should be followed as closely as possible.

Most states have developed guidelines for the plugging of abandoned wells. Consult with your local Health office, NRCS, Extension Service or water quality agency.



Assessing the Condition and Location of Your Drinking Water Well

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1,2,3,4	Have your water tested annually for the most common contaminants, nitrate and bacteria, to see if a problem actually exists.	Extension Service office, Health office, NRCS office, Conservation District office, or water quality agency.		
Question 5,6,7	Measure well casing to make sure it is at least 12 inches above the ground surface. Extend casing if necessary. Fill in depression and create mound around well. Have visible holes in casing repaired.	Extension Service office, Health office, NRCS office, Conservation District office or a licensed well driller.		
Question 8,9	Relocate sources of contaminants downslope from well.	Extension Service office, Health office, NRCS office, Conservation District office or licensed well driller.		
Question 10	Properly close all abandoned wells on your property.	Extension Service office, Health office, NRCS office, or Conservation District office.		

Assessing the Condition & Location of Your Rain Water Collection System (Cistern)

Why should you be concerned?

The condition of your rain water collection system (cistern) is an important factor to consider when looking at the potential for contamination of your drinking water supply. Specifically, you should be concerned about the location, condition, and maintenance of your rainwater collection system.

Some contaminants in water may only affect appearance, while others such as bacteria, nitrate, and toxins can be extremely harmful or even fatal.

What can you do?

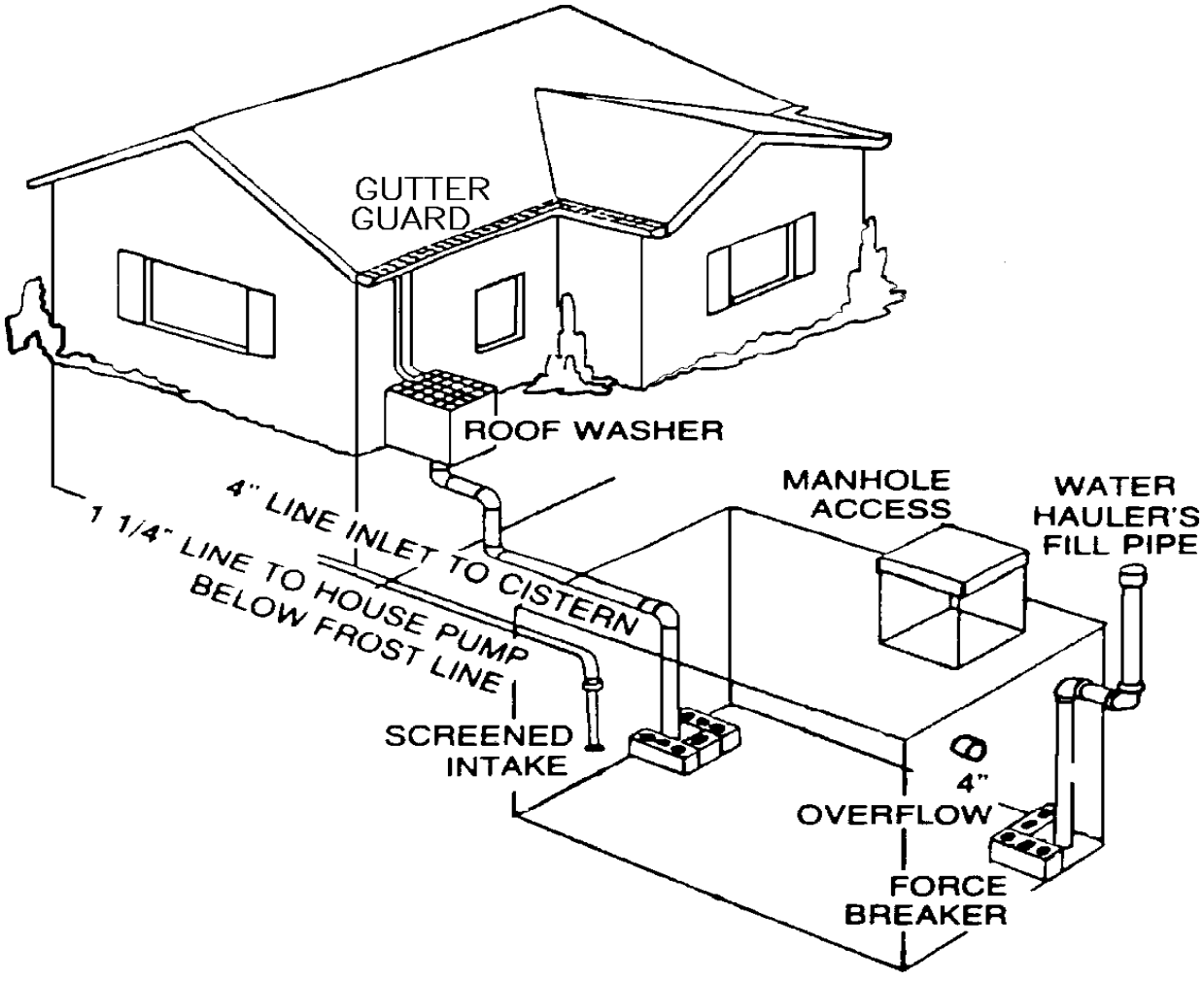
The information in this chapter will address potential contaminants to your drinking water supply, and allow you to take voluntary action to protect your drinking water supply from contamination.

Use this chapter to address questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing the Condition and Location of Your Rain Water Collection System** section in your "Farm and Home Water Quality Assessment." This chapter will help you develop an Action Plan to establish practices that reduce the risks of contamination to your drinking water supply.

Protecting Your Water Quality Through a Farm & Home Assessment

1 Has it been longer than three years since your cistern was emptied and cleaned?

The quality of your water supply is directly dependent upon the management of your collection system. Your cistern should be emptied and cleaned every three to five years to remove sludge deposits. This will minimize the amount of coliform bacteria and other contaminants in your drinking water.



2 Has it been longer than four months since you treated your cistern with chlorine?

You should add chlorine to your system on a regular basis to disinfect your water supply. Treat cistern water with five fluid ounces of liquid chlorine bleach, unscented sodium hypochlorite 5.25% (regular laundry bleach) per 1000 gallons of water monthly or bimonthly depending upon the frequency and amount of rainfall.

As a general rule, add one ounce of chlorine per 400 gallons of water during wet periods and one ounce of chlorine per 200 gallons of water in dry periods.

3 Is there debris on your roof or in your rainwater collection system (drains, pipes, cistern)?

Your maintenance program should include regular cleaning of rooftops (or other collection surfaces), gutters, and pipes leading to the cistern. This will prevent clogging of the system and reduce bacterial contamination.

You should inspect the collection system for blockages and/or debris after every major storm event. (Studies conducted in the Virgin Islands have found leaf litter and other organic debris left on rooftops and in gutters and cisterns to be the primary source of coliform bacteria in cistern drinking water.)

Trees should be pruned back so that branches do not hang over rooftops, gutters, or other collection areas.

4 Is your roof made or coated with toxic materials (i.e., asbestos, lead paint, zinc, etc.)?

Many roof coatings, paints and collection materials can contain toxic substances such as zinc, copper, and lead that can contaminate your cistern water.

For example, galvanized roofing is a source of zinc, roofs with copper flashing can have high copper and lead concentrations, and some roof coatings may contain lead. You should consider treating or replacing these materials with coatings or components that are made from nontoxic materials.

If you suspect your collection system contains or is treated with toxic materials you should have your drinking water tested. Consult with your local Health office or water quality agency.

5 Are there places on your roof, collection area, or in your gutter system where water stands instead of flowing into your cistern?

Standing water on roofs, in the collection system, or in improperly sloped gutters creates birdbaths, mosquito breeding areas, and stagnant water that can reduce the quality of water entering your cistern.

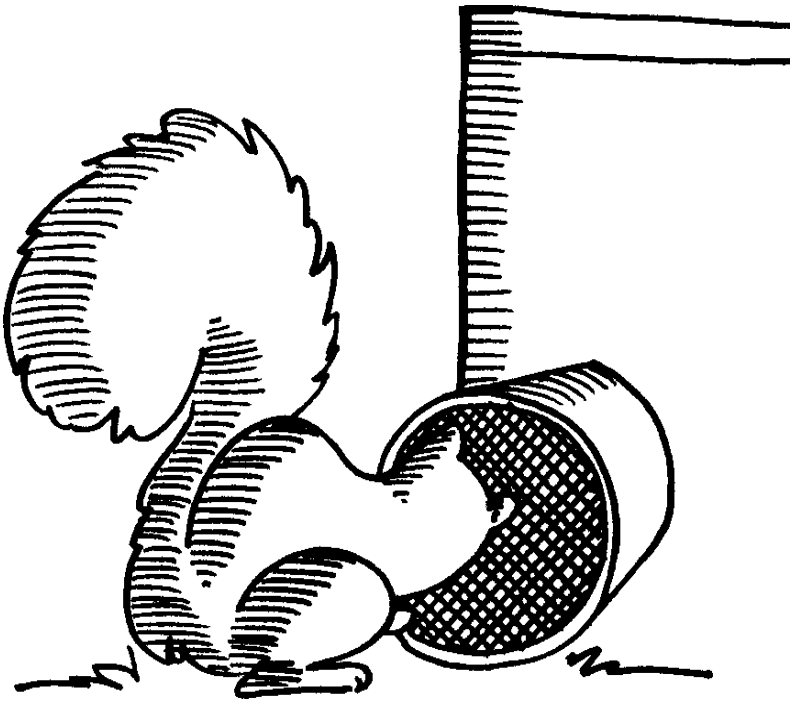
Inspect your system after a heavy rain to see if you have any standing water. Reshape gutter areas where water stands.

6 Can animals or debris enter through the screen(s) on your rainwater collection system?

All openings to your cistern should be screened to prevent animals and debris from entering. Check all screens after major storms to remove any debris that may have collected. It is also a good idea to fence any portion of your collection system that may be accessible to animals and children.

7 Has it been longer than two years since you inspected your cistern for cracks or leaks?

Contaminants from failing septic systems, livestock areas, or a leaking petroleum storage tank can enter cisterns through cracks or leaks, contaminating your drinking water supply. Any cracks or leaks in the cistern should be immediately filled and sealed.



Assessing the Condition and Location of Your Rain Water Collection System (Cistern)

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1	Empty and clean out every 3-5 years.	Local Extension Service office, Health office, Water Quality Agency, NRCS office or Conservation District office.		
Question 2	Add chlorine to your system at recommended rates and intervals.	Local Extension Service office, Health office, NRCS office or Conservation District office.		
Question 3, 7	Develop a regular maintenance schedule. Inspect after large storms.	Local Extension Service office, Health office, NRCS office or Conservation District office.		
Question 4	Cover with nontoxic material or remove toxic material.	Local Water Quality Agency, Extension Service office, Health office, NRCS office or Conservation District office.		
Question 5	Inspect gutters for places where water may stand.	Local Water Quality Agency, Extension Service office, Health office, NRCS office or Conservation District office.		
Question 6	Inspect and repair all damaged screens. Fence collection areas accessible to animals and children. Fill and seal leaks in cistern.	Local Water Quality Agency, Extension Service office, Health office, NRCS office or Conservation District office.		

Assessing Your Site

Protecting Your Water Quality Through a Farm & Home Assessment

Why should you be concerned?

The physical characteristics of your property can affect your drinking water quality. Some of these factors include soil type, slope of the land, depth and type of bedrock, and depth to ground water.

Some types of soils are more susceptible to ground water contamination. Others are more susceptible to erosion that can cause surface water contamination. If your water supply system is located down slope from potential pollution sources, it is at a higher risk of contamination.

Because most contaminant breakdown occurs in the soil, sites with shallow soils, sandy soils, and soils over fractured bedrock will have a higher potential for ground water contamination.

Also, areas with high water tables have a higher risk of ground water contamination.

What can you do?

This chapter has been designed to provide information on questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing Your Site** section of your "Farm and Home Water Quality Assessment." This chapter will help you develop an Action Plan to establish practices that reduce the risks of contamination to your drinking water supply.

1 Has it been longer than five years since you updated or reviewed your resource conservation plan?

The management practices you use will influence your property as well as your neighbors. If you do not have a resource conservation plan, you should develop one. The plan should address: soil, water, air, plants, and animals and how they relate to the land and its surroundings. The plan should include proper management of all areas around your homestead including your residence and all other land uses.

2 Is your soil sandy or gravelly (does your soil drain quickly)?

The soil provides a life support system for growing plants, and acts as a filter to reduce ground water contamination. It is important to know the type(s) of soil on your property.

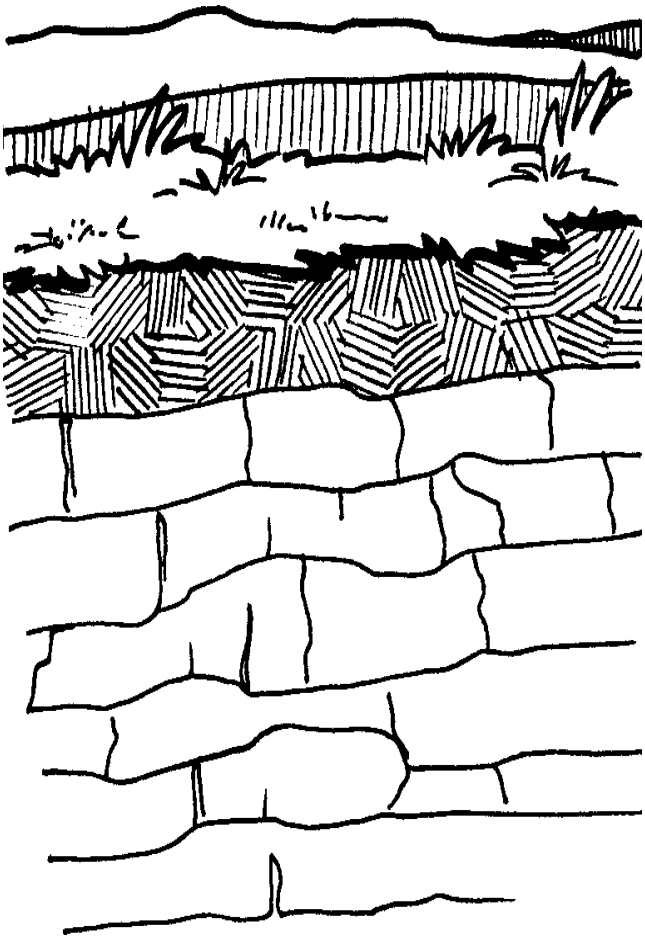
Coarse textured soils such as sands are more susceptible to ground water contamination. These soils have larger pore spaces between the soil particles allowing water to carry contaminants quickly to ground water.

Finer textured soils such as silt loams and clays slow water movement and provide greater filtering. They allow bacteria and other soil organisms to break down contaminants before they reach ground water. However, these types of soils are more susceptible to surface water runoff and may put surface water bodies at risk of contamination.

3 Is your soil less than three feet deep (to bedrock or caliche)?

The depth of soil over bedrock is an important factor in reducing risk to ground water. Generally, soils that are less than three feet to bedrock are considered high risks to ground water contamination.

The type of bedrock below the soils also impacts contamination risk to ground water. Highly fractured rock structures such as limestone or caliche can provide a direct path for pollutants to the ground water.



4 Is your water table less than ten feet from the soil surface ?

The depth of the water table under your property may impact the water quality of your well. Deeper aquifers generally have lower pollution risks than shallow aquifers. Water tables that are less than 10 feet from the surface are generally considered to have high contamination risk.

You should know how deep the water table is under your property. If you do not know the depth to ground water and cannot measure it, consult your well log or local well driller. The well log contains a record of the material drilled through and the depth to water. If you do not have a well log, talk to the well driller or previous property owner for more information.

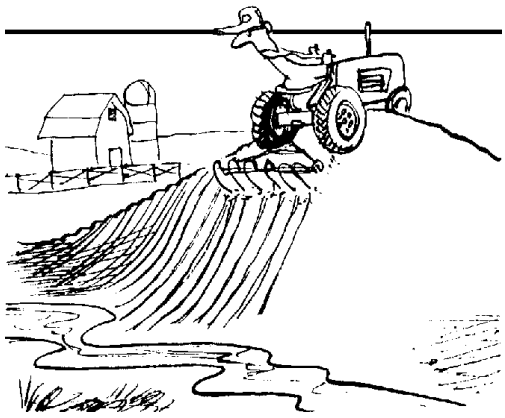
In most cases, your ground water supply is coming from water that soaks through the soil and rock under your property. Your management practices can directly affect the quality of your drinking water supply.

5 Do you have problems with soil erosion on your property?

Soil erosion happens when water moves across the soil surface and the water picks up soil particles. This process can be accelerated with intensive land use and can impact water quality with sediment, nutrients, and pesticides attached to soil particles.

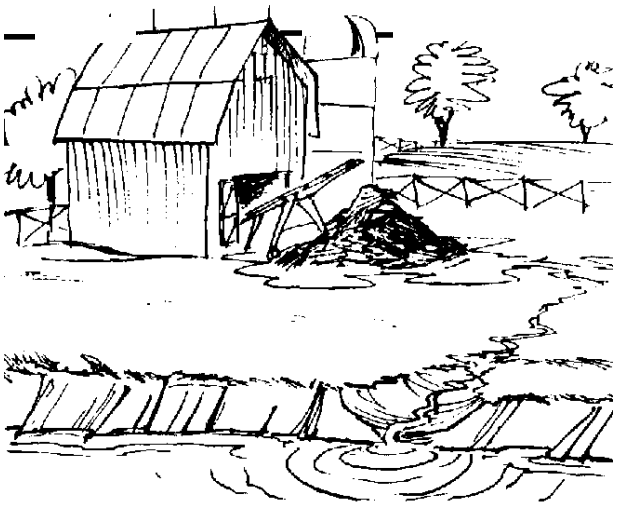
By controlling erosion, you will help to protect water quality and maintain the long term productivity of your land. Soil erosion can be controlled through the implementation of conservation practices and/or best management practices.

Most people feel that they are doing a good job of controlling erosion on their property. However, there may be ways to improve your erosion control practices. Take a good look at current practices you are using to reduce erosion. If there is room for improvement, look into some of the new technologies available.



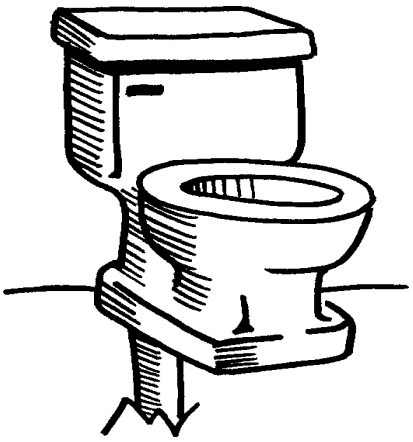
6 Does runoff from your property reach surface waters?

Runoff, from stormwater, drainage, or irrigation practices, may impact surrounding surface water bodies. The level of impact to surface waters is determined by the amount of water, distance to surface water bodies, slope of the land, the contaminants in the path of the running water and your conservation practices.



Assessing Your Site

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1,2,3	Find out your soil type. Find out the depth and type of bedrock under your property. Find out the depth to your water table. Adjust your management practices to reduce water quality impacts.	NRCS office, Conservation District office or State Geological Survey office		
Question 4,5, 6	Develop or modify your Resource Conservation Management Plan to reduce soil erosion and impacts on water quality.	NRCS office, or Conservation District office		



Assessing Your Household Waste Water Treatment System

Protecting Your Water Quality Through a Farm & Home Assessment

Why should you be concerned?

Virtually all rural residents use a septic system or some type of on-site waste water disposal system. While these systems are generally economical and safe, household waste water can contain contaminants that may harm water quality.

Potential contaminants in household waste water can include disease-causing bacteria, infectious viruses, household chemicals, and excess nutrients, such as nitrogen.

What can you do?

This chapter has been designed to provide information on questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing Your Household Waste Water Treatment System** section of your "Farm and Home Water Quality Assessment." This chapter will help you develop an Action Plan to reduce the risks of contamination to your drinking water supply.

1 Do you have an on-site waste water disposal system (septic tank and drain field, seepage pit, or cesspool)?

Household waste water treatment systems are used to treat and dispose of waste water from the home.

A household waste water treatment system that is properly constructed and maintained will function for many years and can minimize the potential for ground and surface water contamination.

Most states have regulations addressing on-site waste water disposal systems. For example, in most areas it is illegal to install a seepage pit or a cesspool.

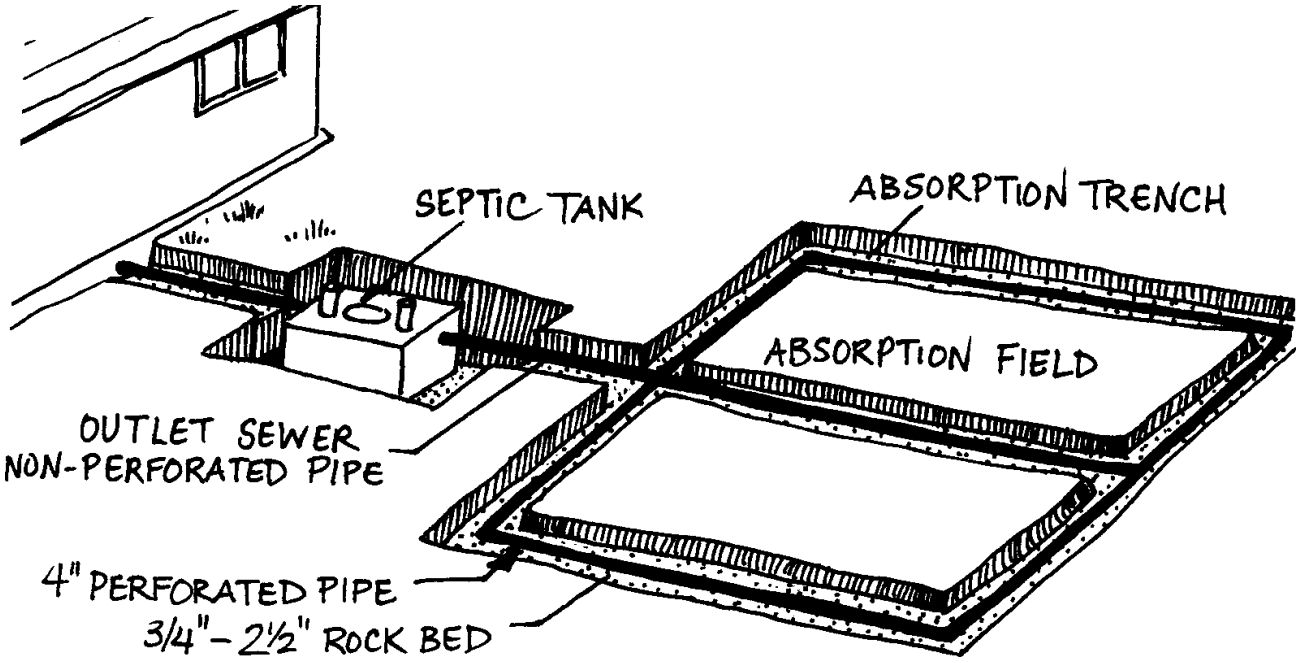
An individual household waste water treatment system, sometimes called a septic system, typically consists of a septic tank and drain field. Waste water from bathrooms, kitchen, and laundry room is routed to the septic tank where liquids and solids are separated.

Soft solids such as grease and soap float to the top and form a scum layer. Other solids settle to the bottom where they can be partially decomposed by bacteria.

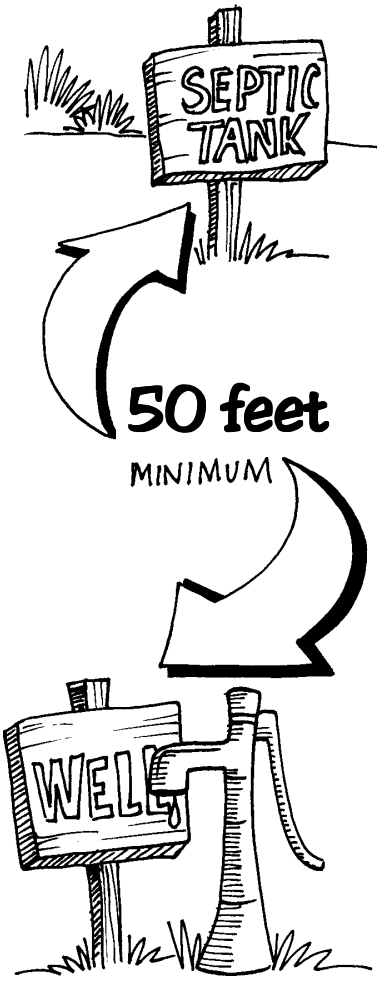
Liquid from the septic tank is discharged into the drain field where harmful, disease causing microorganisms, organics, and nutrients are removed or broken down.

Consider both system design and location when assessing the potential for ground water contamination.

It is also important to avoid driving heavy machinery on drain field area. This can damage the drain field by crushing pipes and compacting absorption area.



2 Is your on-site waste water disposal system less than 50 feet from any water supply system (well, cistern, etc.)?



A primary concern related to the location of your on-site waste water disposal system is that it is a safe distance from your water supply system. In most states, private septic systems are required to be at least 50 feet from a well or cistern. Contact your county or state Health office to determine minimum separation distances for your system.

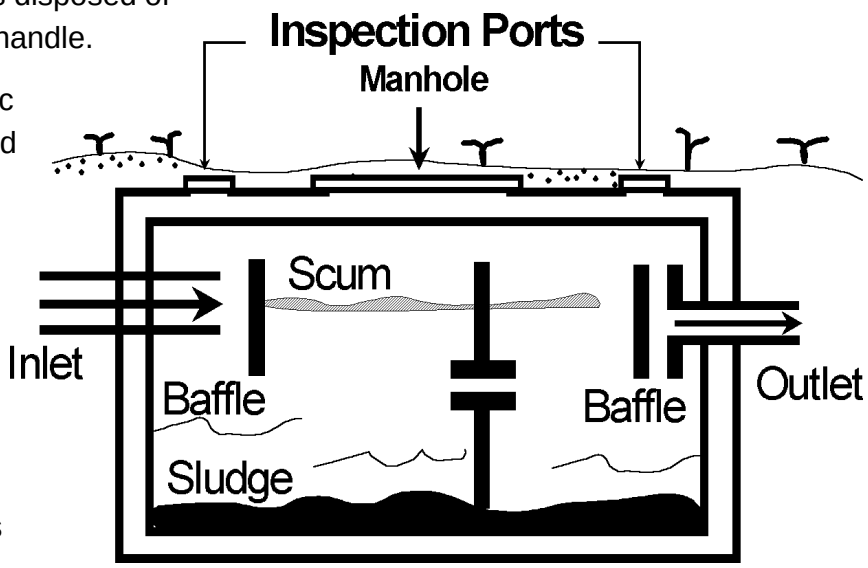
3 Is your on-site waste water disposal system closer than 100 feet from a water body (streams, lakes, coastal waters, etc.)?

If your on-site waste water disposal system is located near a surface water body, there is an increased chance of impacting water quality. Discharges from improperly maintained systems may directly enter a surface water body and may pollute the water.

4 Has it been longer than 3 years since you had your septic tank cleaned out?

Poor management of your septic system increases the risk of your drinking water becoming contaminated. Proper maintenance is one of the most important factors in making sure a septic system will function over a long period of time. Maintenance involves regular pumping and limiting the types of materials disposed of to those that the system can handle.

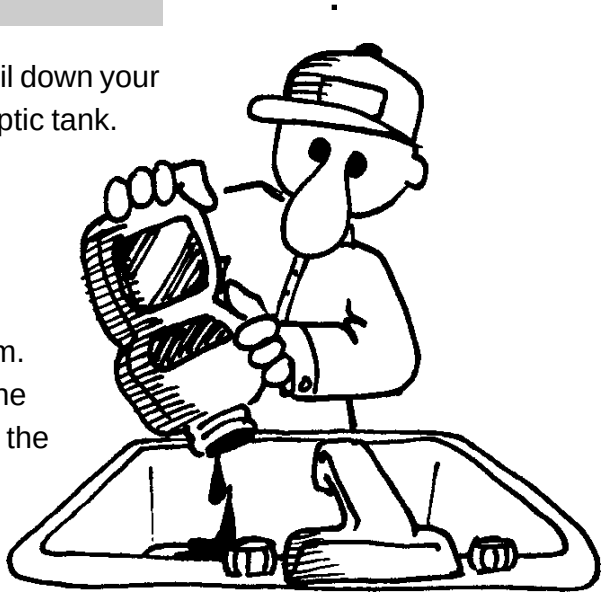
Most properly sized septic tanks need the solids pumped out every two to three years. If a garbage disposal is used, a septic system should be pumped out every one to two years. These are just estimations and the actual time between septic tank pumping will depend on the amount of solids entering your tank.



5 Do you dump grease, oil, or leftover household chemicals down your drain?

You should always avoid dumping grease and oil down your drain. They can plug the pipes or build up in the septic tank. Keep a separate container for used grease and oil. Properly dispose of them with other household garbage.

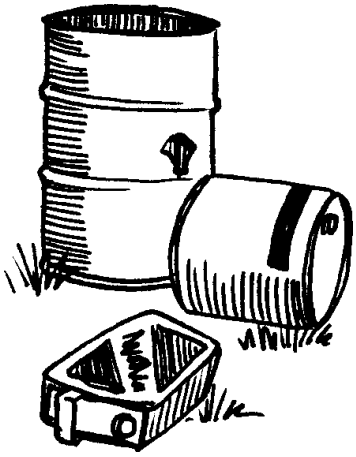
Household chemicals that are poured down the drain can damage your waste water disposal system. Bacteria present in the septic system break down the sewage. When household chemicals are added to the system, they may destroy the beneficial bacteria, reducing the effectiveness of the sewage treatment process.



Assessing Your Household Waste Water Treatment System

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Questions 1, 2,3	Know the location of your waste water disposal system. Test water for bacteria and nitrate. Learn the risks related to runoff and your soil type.	County Health unit, county or regional sanitarian, local Extension Service office, septic system installer or pumper.		
Question 4	Monitor septic tank and pump scum and sludge when needed.	Local septic tank pumping service or local Extension Service office		
Question 5	Do not dispose of grease, oil or other household chemicals down your drain or toilet. Determine where these materials can be safely disposed of.	Local sanitation department or local Extension Service office.		

Assessing Your Household Hazardous Waste Management Practices



Protecting Your Water Quality Through a Farm & Home Assessment

Why should you be concerned?

Land owners/tenants and their families are generally familiar with the hazards of pesticides commonly used in their operations. They may be less aware of the hazards of other chemicals that make many tasks around their property easier or more efficient.

Consider the variety of products commonly used in households and on farms: paints, solvents, oils, cleaners, wood preservatives, batteries, adhesives, and pesticides. Small, unusable amounts of common chemicals often are spilled, buried, dumped or flushed onto rural property. In addition, some common but unsafe disposal practices not only threaten your drinking water, but also may be illegal.

Proper use and disposal of these products can reduce both health risks and the potential for contamination of your drinking water supplies.

Your drinking water is less likely to be contaminated by hazardous waste if you follow appropriate management practices and dispose of waste at an approved disposal site. Proper off-site disposal practices are essential to avoid risking contamination that could affect the water supplies and health of yourself and others.

What can you do?

This chapter has been designed to provide information on questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing Your Household Hazardous Waste Management Practices** section of your "Farm and Home Water Quality Assessment." This chapter will help you develop an Action Plan to establish practices to reduce the risks of contamination to your drinking water supply.

1 Do you dispose of household products such as furniture polish, paints, stains, and cleaners and/or their containers on your property?

Household chemicals such as some furniture polishes, paints, stains, and drain cleaners can contaminate your drinking water supply.

Many rural residents have trash pits or burn barrels located on site. Continual use of these trash pits/burn barrels over the years can lead to a build up of hazardous chemicals in a relatively small area. The potential for dangerous amounts of these chemicals to impact ground and surface waters increases significantly when they are concentrated in this manner.

Many communities have household hazardous waste collection days. These are usually advertised locally. Your local landfill may have more information about these events.

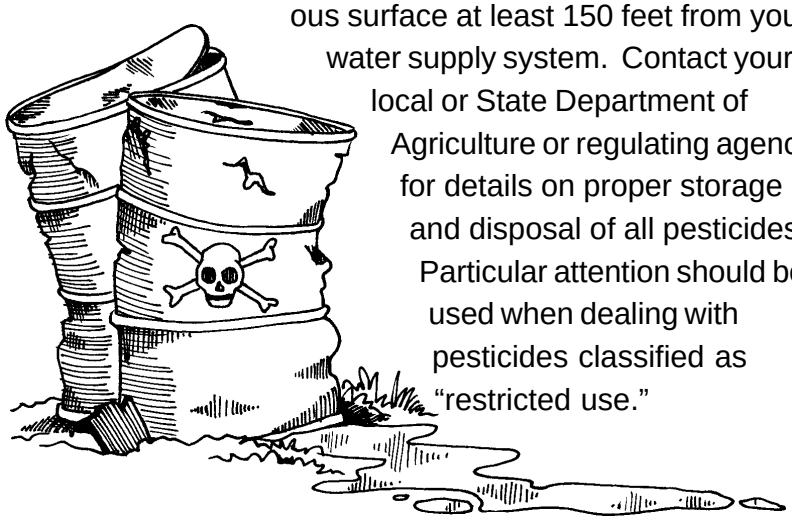
2 Do you dispose of used petroleum products, antifreeze, or lead-acid batteries on your property?

Do not dispose of these materials on your property. Most states have laws regulating their proper disposal. For example, in most cases, it is illegal to dispose of used petroleum products, antifreeze and lead-acid batteries in sanitary landfills.

Contact your local or state health department or water quality agency to determine proper procedures for disposing of these products. These products should be properly stored until they can safely be disposed of. Proper storage includes a secured container on an impervious surface at least 150 feet from your water well and surface water.

3 Do you dispose of leftover or banned pesticides and/or pesticide containers on your property?

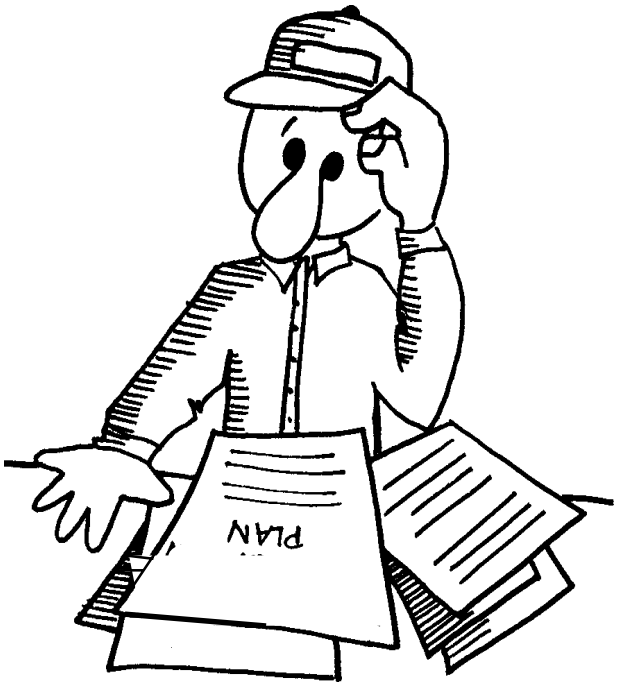
Pesticides and pesticide containers, including those used for yard care and indoor plants, can lead to contamination of drinking water if not properly used, stored or disposed of. Keep all pesticides in a secured storage area with an impervious surface at least 150 feet from your water supply system. Contact your local or State Department of Agriculture or regulating agency for details on proper storage and disposal of all pesticides. Particular attention should be used when dealing with pesticides classified as "restricted use."



Old, unused and banned pesticides and their containers should not be disposed of on your property. They should be stored in a safe place until a collection site is organized for proper disposal. Many states have a collection program to collect unused pesticides and other hazardous wastes. Contact your local Health office, Extension Service office or State Department of Agriculture for more information.

4 Are any of the hazardous products mentioned in the first three questions accessible to children and pets?

Each year, hundreds of children and pets are injured or poisoned because of improperly stored hazardous household products. All household hazardous products and wastes need to be secured until they can be used or properly disposed of. Educate your family on the dangers of these products.



5 Do you need a plan to handle spills of hazardous products?

All families should have an updated emergency response plan to handle hazardous material spills and other emergencies. The plan should include: where hazardous products are stored, emergency response numbers, and finally, what to do in case of an accident. Contact your local Extension Service office or Health office to get more information on developing an emergency response plan.

Assessing Your Household Hazardous Waste Management Practices

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1,2,3	Inventory all household hazardous materials, pesticides, and containers on your property. Obtain information about proper disposal.	Call your local Extension Service office, Health office, Department of Agriculture, or local landfill.		
Question 4	Develop a secured storage area.	Local Extension Service office or State Department of Agriculture.		
Question 5	Develop an emergency response plan.	Local Extension Service office, Emergency Government office or Health office.		

How To Dispose of Household Hazardous Material

Household Hazardous Material: Think Before You Dump It

When you dump a can of paint thinner down the drain or throw an old car battery out with the trash, you could be poisoning your water supply. That's because wastewater treatment plants are not designed to handle certain types of hazardous wastes. And in landfills, these dangerous materials can pollute the environment through the ground water, surface water, and air.

You can help protect your environment if you know how to take care of the wastes. The chart on the reverse side shows you the most effective ways to dispose of common hazardous material used around the home or garden. The information is intended as a general guideline because laws and regulations may vary from state to state. Additionally, product formulation can change over time. Be sure to check manufacturer's label for specific disposal guidelines, and above all use common sense!

For more information on the safest way to dispose of the products on the chart, contact your state's solid and hazardous waste department or the U.S. Environmental Protection Agency. You may also want to note important local phone numbers below:

Hazardous Waste Management Agency _____

Poison Control Center _____

How to Dispose of Household Hazardous Wastes

	Type of Waste	●	♦	❒	❖
Kitchen	Aerosol cans (empty)		♦		
	Aluminum cleaners	●			
	Ammonia based cleaners	●			
	Bug sprays			❒	
	Drain cleaners	●			
	Floor care products			❒	
	Furniture polish			❒	
	Metal polish with solvent			❒	
	Window cleaner	●			
	Oven cleaner (lye base)		♦		
Bathroom	Alcohol based lotions (aftershaves, perfumes, etc.)	●			
	Bathroom cleaners	●			
	Depilatories	●			
	Disinfectants	●			
	Permanent lotions	●			
	Hair relaxers	●			
	Medicine (expired)	●			
	Nail polish (solidified)		♦		
	Toilet bowl cleaner	●			
	Tub and tile cleaners	●			

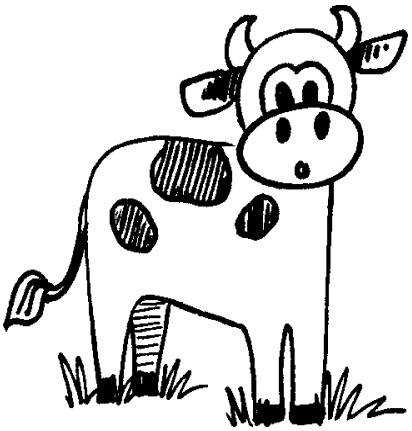
❒ Identifies hazardous wastes which should be saved for a community-wide collection day or given to a licensed hazardous wastes contractor. (Even the empty containers should be taken to a licensed contractor if one is available.)

Type of Waste	●	♦	❒	❖
GARAGE				
Antifreeze				❖
Automatic transmission fluid			❒	❖
Auto body repair products		♦		
Battery acid (or battery)			❒	❖
Brake fluid			❒	
Car wax with solvent			❒	
Diesel fuel			❒	❖
Fuel oil			❒	❖
Gasoline			❒	❖
Kerosene			❒	❖
Metal polish with solvent			❒	
Motor oil			❒	❖
Other oils			❒	
Windshield washer solution	●			
WORKSHOP				
Paint brush cleaner with solvent			❒	❖
Paint brush cleaner with TSP	●			
Aerosol cans (empty)		♦		
Cutting oil			❒	
Glue (solvent based)			❒	
Glue (water based)	●			
Paint — latex		♦		
Paint — oil based			❒	
Paint — auto			❒	
Paint — model			❒	
Paint thinner			❒	❖
Paint stripper			❒	
Paint stripper (lye based)	●			
Primer			❒	
Rust remover (with phosphoric acid)	●			
Turpentine			❒	❖
Varnish			❒	❖
Wood preservative			❒	
LAWNS, GARDENS AND FIELDS				
Fertilizer		♦		
Fungicide			❒	
Herbicide			❒	
Insecticide			❒	
Rat poison			❒	
Weed killer			❒	
MISCELLANEOUS				
Ammunition			❒	
Artists' paints, mediums			❒	
Dry cleaning solvents			❒	❖
Fiberglass epoxy			❒	
Gun cleaning solvents			❒	❖
Lighter fluid			❒	
Mercury batteries			❒	
Moth balls			❒	
Old fire alarms			❒	
Photographic chemicals (unmixed)			❒	
Photographic chemicals (mixed and properly diluted)	●			
Shoe polish		♦		
Swimming pool acid			❒	

◆ Identifies materials which cannot be poured down the drain, but can be safely disposed of in a sanitary landfill. Be certain the material is properly contained before it is put our for collection or carried to the landfill.

● Identifies products which can be poured down the drain with plenty of water. If you have a septic tank, additional caution should be exercised when dumping these items down the drain. In fact, there are certain chemical substances that cannot be used with a septic tank. Read the labels to determine if a product could damage the septic tank.

❖ If there is a recycling program in your area, take these recyclable materials there. If not, encourage local officials to start such a program.



Assessing Your Livestock and Poultry Operations

Why should you be concerned?

Livestock and poultry operations on your property can generate large amounts of manure. This manure can serve as a valuable resource. However, when improperly managed, nutrients, bacteria, and other micro-organisms can contaminate your drinking water supply. When livestock manure is concentrated, as it is in barnyards, holding areas, and feedlots, the risk of polluting surface and ground waters often increases.

What can you do?

This chapter has been designed to provide information to questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing Your Livestock and Poultry Operations** section of your "Farm and Home Water Quality Assessment." This chapter will help you develop an Action Plan to establish practices that reduce the risks of contamination to your drinking water supply.

Protecting Your Water Quality Through a Farm & Home Assessment

1 Do you have livestock and/or poultry on your property?

Livestock and poultry operations can impact water quality. Proper use of manures as a nutrient source can reduce fertilizer purchases, improve soil quality, and reduce pollution risks. Ground and surface waters can be polluted if too much manure is applied or if the nutrients available in manure are not counted in the crop's nutrient budget.

If you do not have a manure management plan for your livestock or poultry operation, contact your local Natural Resources Conservation Service, Conservation District or Extension Office.

2 Do you house livestock and/or poultry within 100 feet of a water supply (well, cistern, etc.)?

All livestock operations should be located at least 100 feet downhill from private water supplies (including abandoned wells) and 500 feet from public water supply systems.

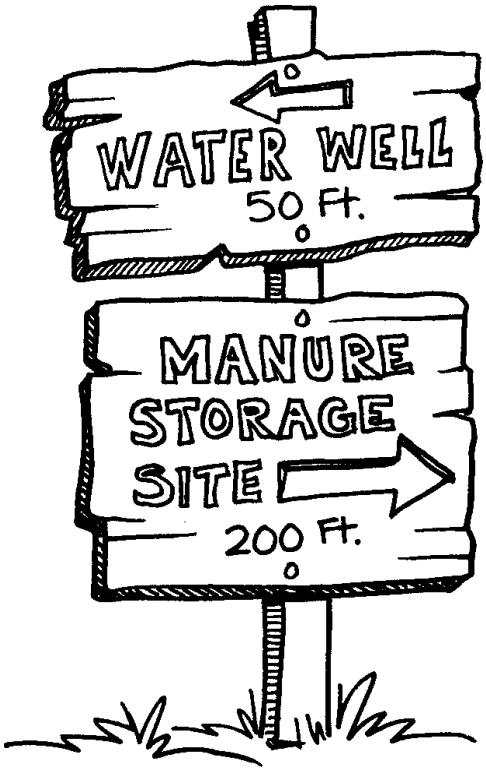
If you have a livestock operation on your property you should be testing your water annually for bacteria and nitrate.

3 Do you store manure within 250 feet of a water supply system (well, cistern, etc.)?

Manure is generally stored in either liquid, semi-solid or solid forms. Each of these can be stored safely, but do require proper management to prevent water contamination. Contact local NRCS, Conservation District office, or local Extension office for information on proper storage practices.

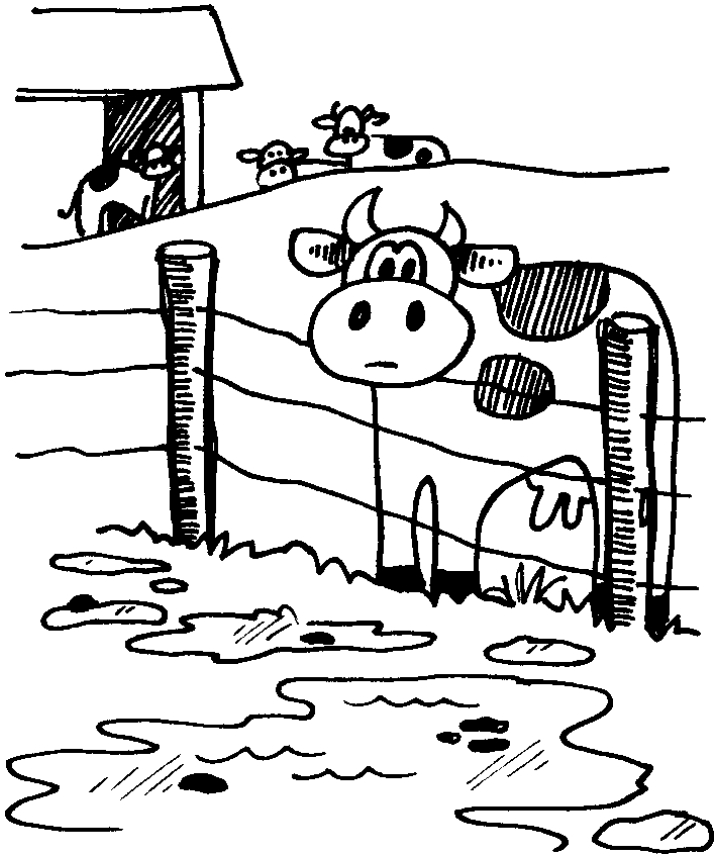
Of particular concern are existing wells that can provide a direct path for contaminated surface water to reach the ground water. Long distances between manure storage sites and your water supply are the best preventive measure that can be taken. Avoid manure storage within 250 feet of your well.

Storage facilities should be designed to prevent unplanned off-site movement of manure. Reducing the volume of stored manure with regular use of stored manure helps to reduce pollution risks.



4 Is your livestock and/or poultry facility located uphill from a water supply system (well, cistern, etc.)?

Runoff from livestock areas can transport animal manure to locations that may cause water contamination. Runoff is affected by slope, rainfall and maintenance of the facility. Your facility should be located downhill from your water supply so that runoff will not drain toward it. Surface water runoff should be diverted around the facility.



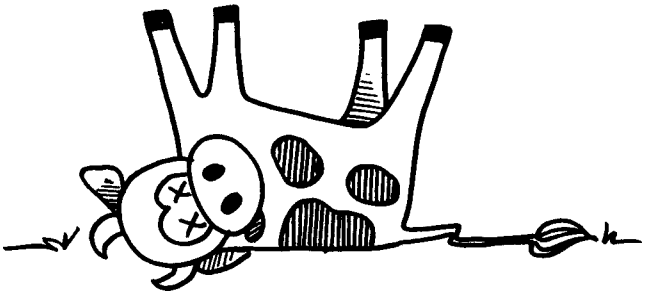
5 Do you dispose of dead animals on your property?

Dead animal disposal on your property is a potential water pollution risk. Decomposing animals can be a concentrated source of nutrients, bacteria and other potentially harmful micro-organisms.

Develop a plan for proper disposal of dead animals. Small animals can be best disposed of by composting. A rendering service is generally better for larger animals. Check your local and state laws before disposing of dead animals.

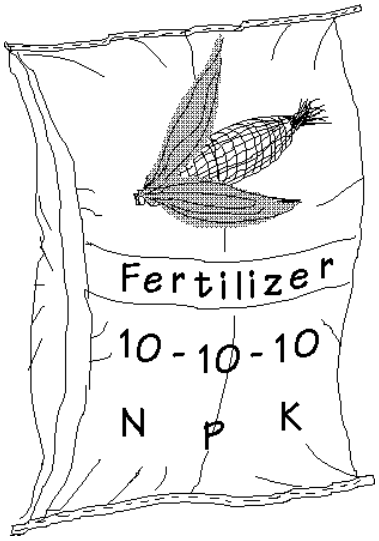
6 Do you spread manure on your fields, lawns, and gardens without considering the amount of nutrients in the manure?

Manure should be treated as a resource rather than a waste product. Store manure in an approved storage system until it can be used to provide nutrients for your crops. Credit nutrients from all manures in your nutrient management plan. Apply all manure with properly calibrated equipment. Maintain records of your manure applications.



Assessing Your Livestock and Poultry Operations

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1,6	Develop a manure management plan that treats manure as a nutrient resource.	Your local Extension Service office, NRCS office, Conservation District office or crop consultant.		
Question 2	Test your water for nitrate and bacteria contamination. Move livestock area if possible.	Local health office or water quality agency.		
Question 3	Use an approved storage system.	Your local Extension Service office, NRCS office, or Conservation District office.		
Question 4	Develop a run-off control system or move the feed yard.	Your local Extension Service office, NRCS office, or Conservation District office.		
Question 5	Develop a system for proper disposal of dead animals.	Your local Extension Service office, NRCS office, or Conservation District office.		



Assessing Your Fertilizer Storage & Handling Practices

Protecting Your Water Quality Through a Farm & Home Assessment

Why should you be concerned?

Fertilizers play a vital role in agriculture. They have increased crop production dramatically.

Runoff from non-point pollution sources such as agriculture is receiving a great deal of attention. National studies indicate that agricultural pollution adversely affects portions of more than two-thirds of the nation's river basins.

Commercial fertilizer, when applied to fields, lawns, and gardens, is a major source of nitrate that can impact ground water. The other major components of commercial fertilizer, phosphorus and potassium, are generally not a ground water contamination concern but can affect surface water quality.

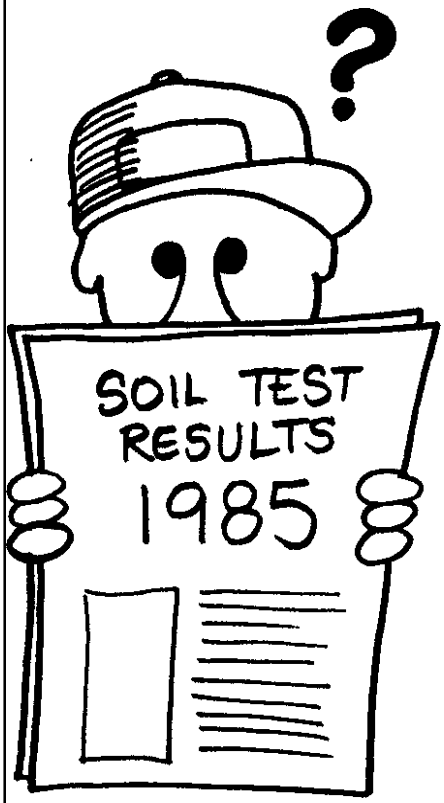
The public health standard for nitrate-nitrogen in drinking water is 10 milligrams per liter (mg/l, equivalent to parts per million for water measurement). Nitrate levels exceeding this standard have been found in many wells and can pose a risk to some infants.

What can you do?

This chapter has been designed to provide information to questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing Your Fertilizer Storage and Handling Practices** section of your "Farm and Home Water Quality Assessment." This chapter will help you develop an Action Plan to establish practices that reduce the risks of contamination to your drinking water supply.

1 Has it been longer than three years since you had your soil tested (i.e., fields, lawns, and gardens)?

A key first step in any nutrient plan is to identify existing levels of soil nutrients. You should test your soil at least once every three years and maintain a record of previous soil tests by fields. If you use a more intensive cropping system such as double cropping, you may want to consider testing every year.



2 Is your soil sandy or gravelly (does your soil drain quickly)?

Coarse textured soils such as sands are more susceptible to ground water contamination. Sandy soils have larger pore spaces between soil particles. Water soaks in quickly to percolate and the risk of carrying contaminants to ground water increases.

Finer textured soils such as silt loams and clays slow water movement and provide greater filtering. They act as a natural filter, allowing bacteria and other soil organisms to break down contaminants before they reach ground water. These types of soils are more susceptible to surface water runoff and may put surface water bodies at risk of contamination.

Soils high in organic matter also help to reduce risk to ground water.

If you do not know what soil types are on your property, contact your local Natural Resource Conservation Service Office, Conservation District, or Extension Office to get a detailed soils map. Manage your soil testing and nutrient applications by soil types. Keep accurate records of fertilizer applications by soil type for each crop and for each field.

3 Do you apply animal manures and/or crop residues to your fields, lawns, and gardens?

Include all sources of applied nutrients. If you are applying animal manure or are incorporating residues from a previous crop you will need to adjust your current nutrient budgets to include these inputs. Organic matter and previous crop residues will affect nutrient availability. See your local Extension Service office, NRCS, Conservation District, or crop consultant to adjust for these inputs.

4 Do you apply animal manure without knowing or testing it for nutrient content?

Manure can provide all or a key portion of your crop's nutrient needs. Be sure to credit nutrients from all manure applications (from this year as well as previous years) in nutrient budgets. Store manure in a facility that will prevent contamination to both ground and surface water.

Use accurate testing to determine the nutrient content of your manure. Monitor changes in analysis when emptying out storage facilities. Be sure application equipment is properly calibrated and is functioning properly.

5 Do you make fertilizer applications based on maximum crop yields rather than historical crop yields?

Use realistic yield goals. Yield estimates that are too high will result in soil nutrient levels beyond those needed by the crop and could result in excess nutrient ground and surface water pollution.

Do not base nutrient recommendations on yields greater than 10-20 percent above the average crop yield from the last three years. Keep accurate records.

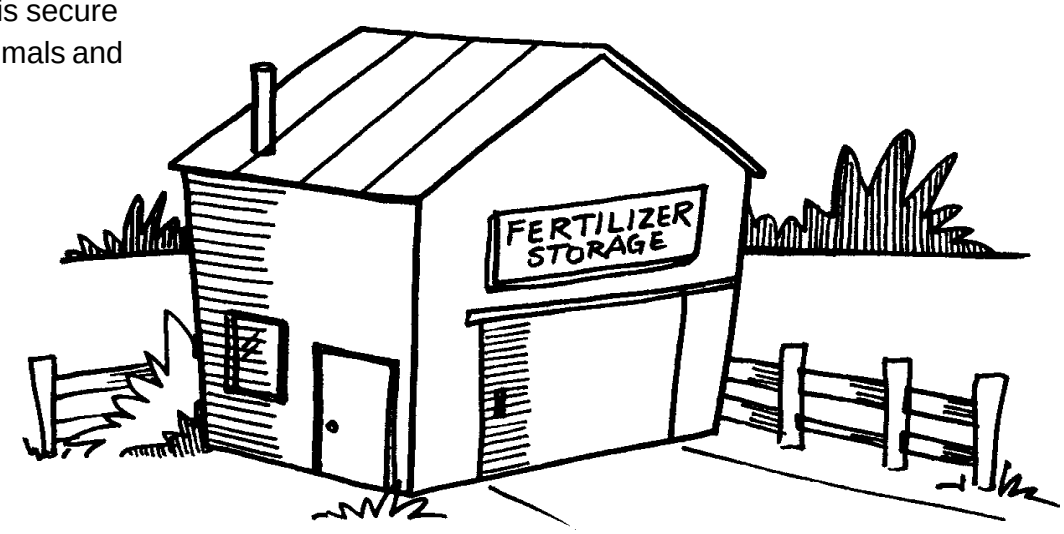
6 Do you apply all the fertilizer needed for the whole growing season at one time?

If you over fertilize your fields, lawns, or garden areas with manures, crop residues, and/or commercial fertilizers you are potentially impacting your drinking water quality. Whenever possible, time your fertilizer applications to fit crop needs. Apply fertilizer when the crop is actively growing. Use split applications of nitrogen on sandy soils. Keep accurate records of all fertilizer applications.

7 Do you store fertilizer products on your property?

If stored properly in a secure location, fertilizers pose little danger to ground water or surface water. You should store all liquid fertilizers on an impermeable floor such as concrete. The floor should have a curb that will hold up to 125% of the volume stored in case of a spill. A mixing and loading concrete pad with secondary containment should be provided for all liquid fertilizers.

Store piles of dry bulk fertilizer on an impermeable surface under cover or in a building. Treat a fertilizer mixed with a pesticide as a pesticide. Locate fertilizer storage areas at least 100 feet downhill from your water supply. Be sure all fertilizer storage is secure from children, animals and vandalism.

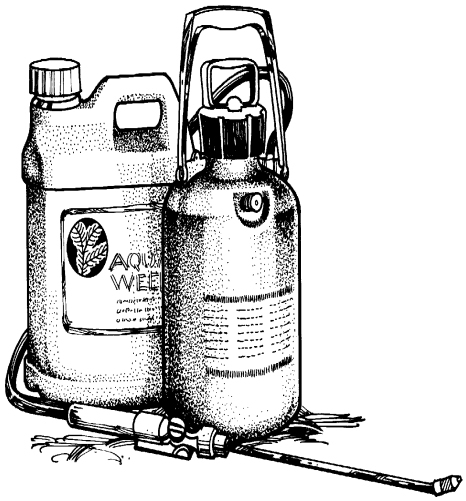


8 Has it been longer than one year since you updated your nutrient management plan?

If you over fertilize your fields, lawns, or garden areas you are potentially impacting the water quality in your area. If you do not have a detailed nutrient management plan, you need to develop one. The plans should be realistic and need to include all potential sources of nutrients (including animal manures).

Assessing Your Fertilizer Storage and Handling Practices

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1	Soil test at least every 3 years.	Your local Extension Service office or crop consultant.		
Question 2	Get a detailed soils map of your fields.	Your local NRCS office, Conservation District office or Extension Service office.		
Question 3,4	Test your manure. Credit all nutrient sources.	Your local Extension Service office, NRCS office, Conservation District office or crop consultant		
Question 5,6,8	Use realistic crop yield goals. Apply fertilizer based on crop growth needs.	Your local Extension Service office, NRCS, Conservation District or crop consultant.		
Question 7	Develop a properly designed fertilizer storage system.	Your local Extension Service office, NRCS office, Conservation District office or your State Department of Agriculture.		



Assessing Your Pesticide Storage & Handling Practices

Protecting Your Water Quality Through a Farm & Home Assessment

Why should you be concerned?

Pesticides play a vital role on farms and other rural properties.

These products, however, must be stored and handled safely to protect both people and water quality. Two major areas of concern related to pesticides are (1) storage practices and (2) handling practices which include mixing, loading, application, and disposal.

Pesticides work by interfering with the life processes of plants and insects. Some pesticides are also toxic to humans.

When found in water supplies, pesticides normally are not present in high enough concentrations to cause acute health effects, such as chemical burns, nausea and convulsions. Instead, they typically occur in very small amounts and can cause chronic health problems (such as cancer, birth defects, etc.) from prolonged exposure.

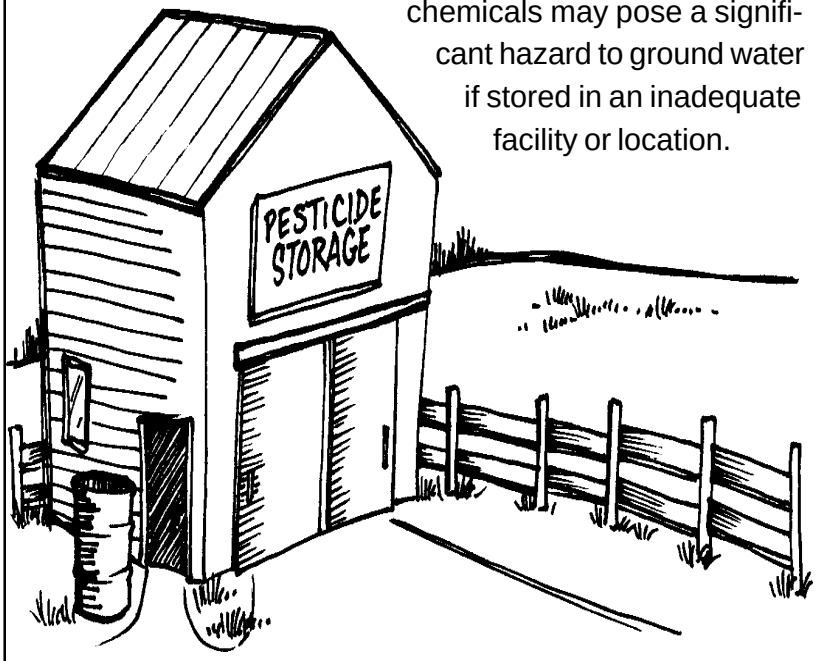
What can you do?

This chapter has been designed to provide information to questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing Your Pesticide Storage and Handling Practices** section of your "Farm and Home Water Quality Assessment." This chapter will help you develop an Action Plan to establish practices that reduce the risks of contamination to your drinking water supply.

1 Do you use or store pesticides on your property?

Before you make a decision about storing pesticides, you need to balance cost, expected use, and risks associated with storing pesticides. Risks associated with storing pesticides include leaking containers, inadequately protected storage sites, and disposal of unwanted or unusable pesticides.

Even in large quantities, pesticides can be stored without threat to ground water quality. On the other hand, relatively small amounts of chemicals may pose a significant hazard to ground water if stored in an inadequate facility or location.

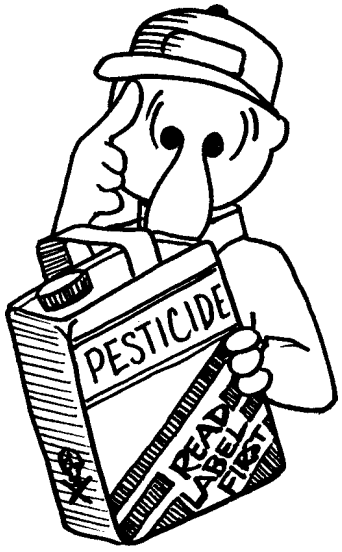


The storage facility should be located downhill from your water supply and other sensitive areas. If you store pesticides on a regular basis, you should consider building a properly designed storage system with a concrete floor, secondary containment, and a temperature and humidity-controlled environment. In all cases, make sure your pesticides are protected from vandalism and secured from children and animals.

2 Do you mix, apply, or store pesticides without reading the label first?

Before buying, storing, or applying pesticides, read the label to make sure the product will do what you want it to do. Be sure it can be applied safely and that you have all the necessary safety equipment.

Always follow the instructions on the label for proper use and storage of the product. The label also provides additional information such as the re-entry period (how long you must keep people and animals out of the field), first aid, and other hazards.

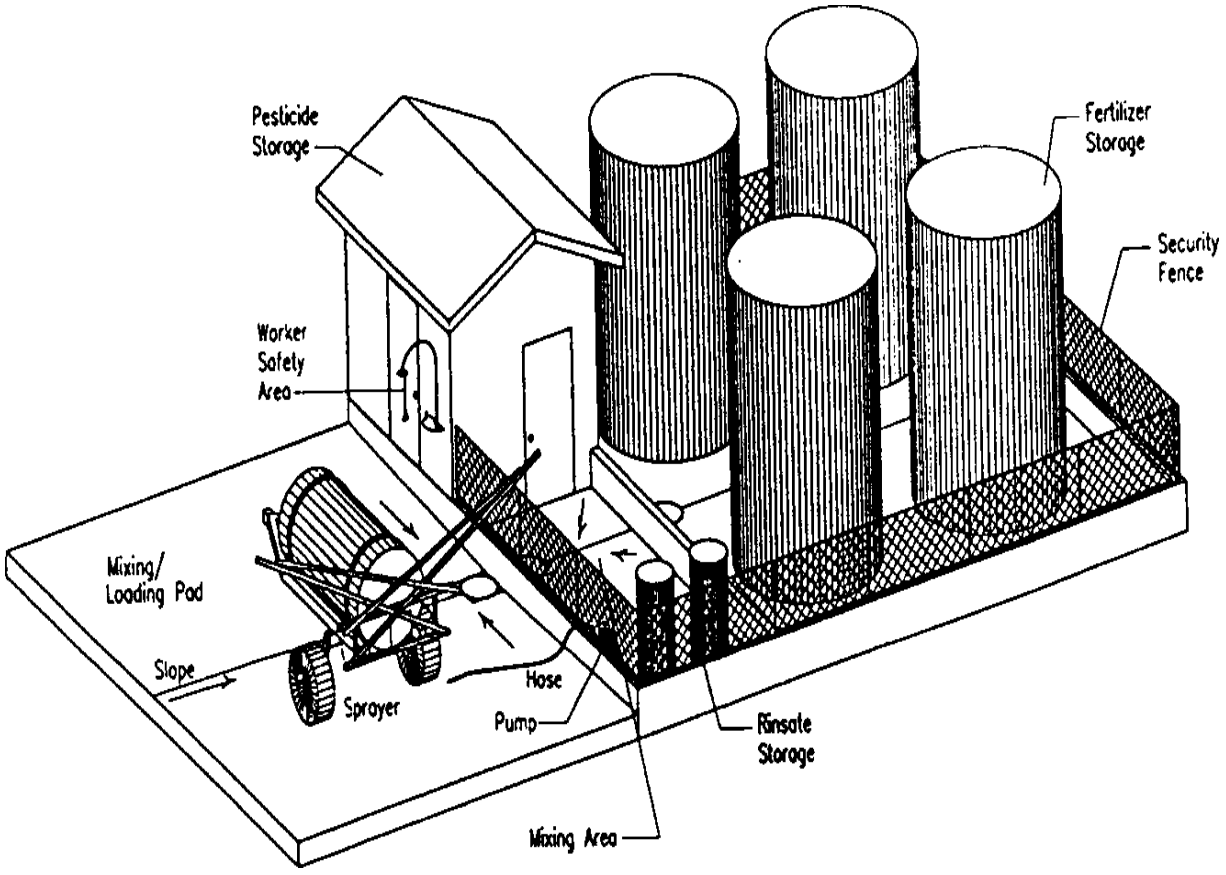


3 Are your pesticides stored on wood, gravel, soil, or on a concrete pad without a curb?

Containment is very important in the event of an accidental spill.

The floor of the storage site should be made of sealed concrete or some other easily cleaned, non-permeable material and should hold a minimum of 125% of total stored volume. Carpeting, wood, soil, and other absorbent floors should not be used because they are difficult or impossible to decontaminate in the case of a leak or spill.

For easier clean-up, shelving and pallets should be made of non-absorbent material such as plastic or metal. If wood or fiberboard materials are used, they should be coated or covered with plastic, polyurethane or epoxy paint.



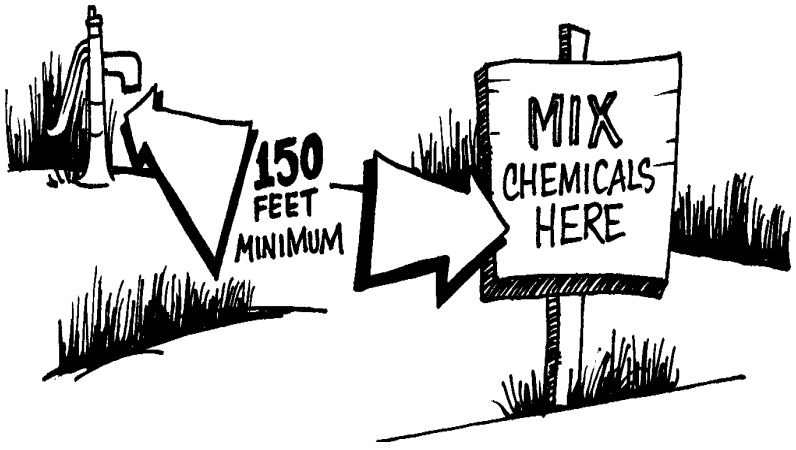
4 Do you have pesticide containers that are damaged, leaking and/or rusting?

A major concern about the condition of pesticide containers is the potential for leaks and spills. If you have containers that are rusting or have holes or tears, the pesticide should be used or disposed of immediately. You should monitor your pesticide storage for leaks.

Be careful to keep all pesticides in their original containers with their proper labels. Information on the pesticide label is invaluable for proper cleanup, disposal, and emergency action if the pesticide is spilled or leaked. Information about pesticide disposal programs for old and unused pesticides can be obtained from your local Extension Service Office or state Department of Agriculture.

5 Do you mix, apply or store pesticides within 150 feet of any drinking water supply (well, cistern, etc.)?

Mixing, loading, storing, or applying pesticides near or directly uphill from your drinking water supply system is not recommended. Use a secondary water source on a properly constructed mixing and loading pad or field mix and load with a nurse tank to reduce risks. Pesticides should always be stored in a secured, spill-proof facility downhill from your water supply.



6 Do you fill your sprayer tank directly from a drinking water supply system?

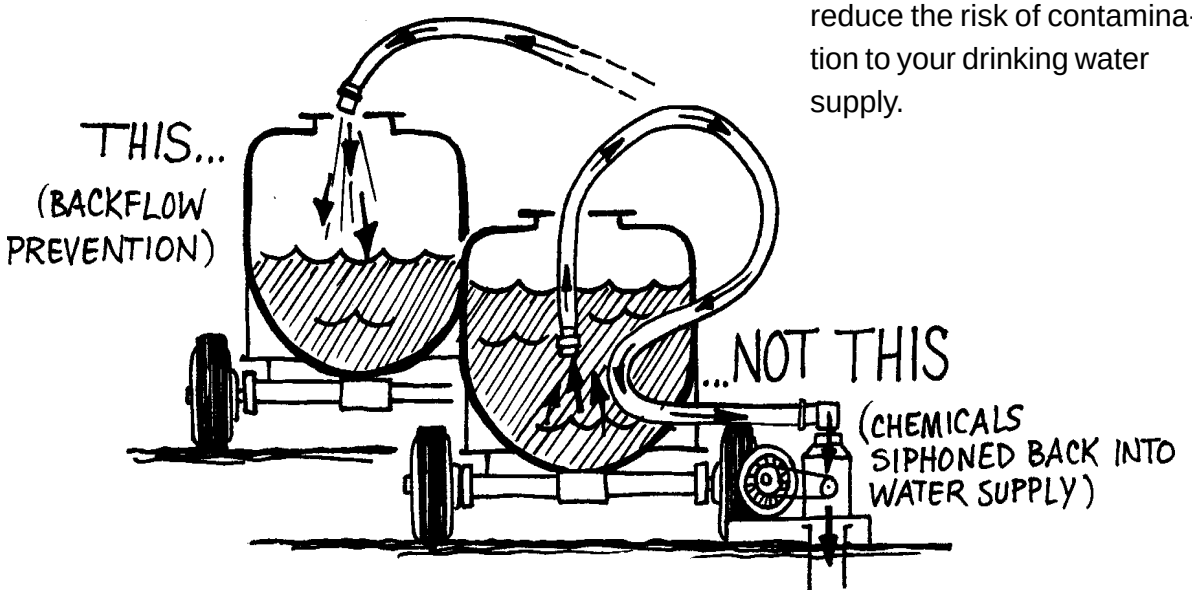
Filling your sprayer directly from your drinking water supply system is not recommended. Your drinking water supply has an increased chance of being contaminated if you fill your sprayer directly from it. Using a secondary water source such as a holding or nurse tank will eliminate this risk.

When filling directly from your water supply, the mixing and loading area should be at least 150 feet downslope from your drinking water supply.

Although this will reduce risks from spills, it will not prevent back-siphoning. Back-siphoning is when the flow of water is reversed, possibly taking some of the pesticide back into the well.

7 Do you fill your sprayer tank with a hose that does not have a check valve or put the hose in the tank so that it is in contact with solution being mixed?

Always keep your water hose or pipe above the level of the pesticide mixture. This will prevent water and pesticides from being drawn back into your water supply if the pump fails or is shut off. A back-siphoning device or check valve should always be used when filling a pesticide tank. These can be found at a farm supply store, hardware store, or irrigation supply outlet. They are relatively inexpensive and reduce the risk of contamination to your drinking water supply.

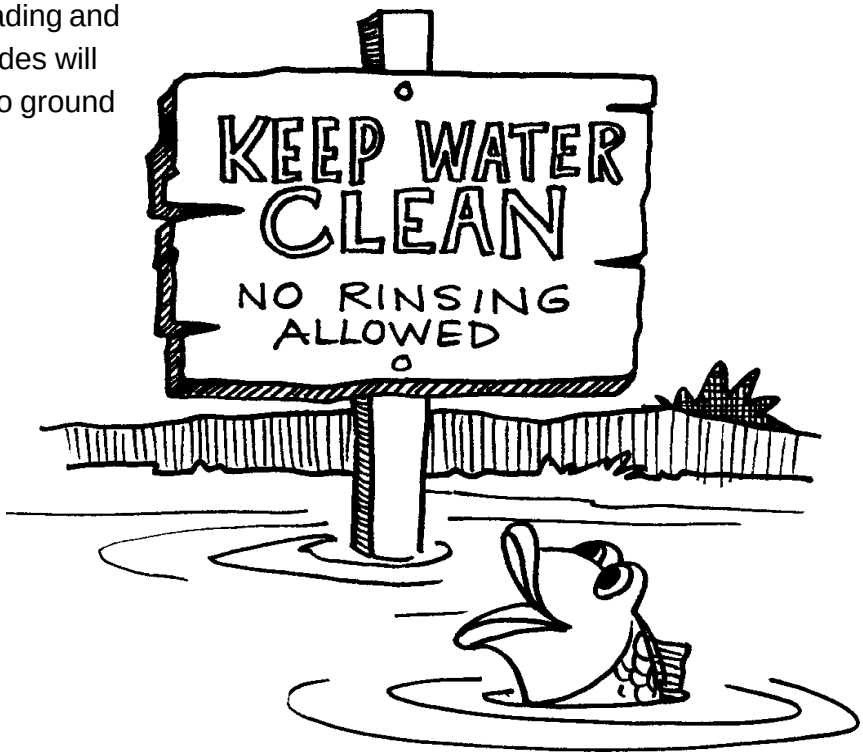


8 Do you leave your sprayer tank unattended while filling?

You are responsible for the proper mixing and loading of all the pesticides you use. When a sprayer tank is left unattended, it increases the risk of contamination from spills or over filling. Repeated spilling of pesticides due to tank overflow allows pesticides to concentrate in the soil and increases their potential to move downward into the ground water. There is a risk of back-siphoning pesticides directly into the water source if the pump should stop while filling the tank. Careful loading and mixing of pesticides will reduce the risk to ground water.

9 Do you rinse out your sprayer tank near your water supply (well, cistern, etc.) or a water body?

After pesticide applications, clean all equipment. Cleaning should be done away from your drinking water supply system and surface water bodies. The rinse water should be used in the next spray mix or it should be applied to the field you just finished spraying. A clean water tank or nurse tank on the sprayer is a convenient way to have clean water in the field to wash out your sprayer.



10 Do you apply pesticides without recalibrating your sprayer?

The use of calibrated equipment can be as important as the selection of the pesticide you are applying. Calibrating your equipment will reduce problems such as drift, non-uniform coverage, failure of the pesticide to reach a targeted organism, and exposure to non-target organisms.

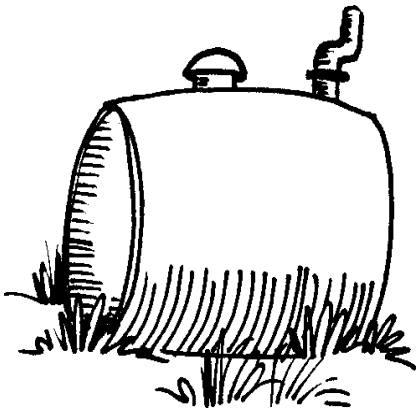
Before calibrating your sprayer, make sure your equipment can apply the product according to the label rate. Each spray nozzle should be within 5 per cent of volumes required. Proper calibration of appropriate equipment ensures that pesticides are applied uniformly according to label rates.

11 Has it been longer than five years since you attended a pesticide applicator training?

Most states have regulations requiring an applicator to be licensed in order to apply restricted use pesticides. However, if you are applying any pesticides, you should consider taking private applicator training and obtaining license certification. Contact your local Extension Office to learn how to become a certified private applicator.

Assessing Your Pesticide Storage and Handling Practices

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1	Assess type and quantity to be stored.	Local Extension Service office, State Dept. of Agriculture, or NRCS or Conservation District office.		
Question 2	Always read the label.	Crop consultant.		
Question 3,4	Develop a storage and handling plan. Dispose of unused products according to their labels.	Contact your local Extension Service office or NRCS or Conservation District office.		
Question 5,6,7,8,9,10	Try not to fill directly from your well. Use a hydrant (located at least 150 feet from your well), or a water holding tank.	Your local farm or hardware store.		
	Make sure your fill hose is not below the water tank level and is equipped with a backflow device.	Contact your local Extension Service office or private crop consultant for training on calibration.		
	Get training and become certified. Always read label.	Contact your local Extension Service office prior to applica-tion.		
	Spread rinse water out in a crop field.			
	Check your equipment on a regular basis. Always calibrate sprayer prior to applying pesticides.			
	Never leave sprayer tank unattended.			



Assessing Your Petroleum Product Storage Facilities

Protecting Your Water Quality Through a Farm & Home Assessment

Why should you be concerned?

Above ground and underground storage of liquid petroleum products such as motor fuel and heating fuel present a threat to public health and water quality.

According to estimates by the U.S. Environmental Protection Agency, nearly 1 out of every 4 underground petroleum storage tanks in the United States may now be leaking.

A few quarts of gasoline in the ground water may be enough to severely pollute your drinking water supply. At low levels of contamination, fuel 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.

Petroleum fuels contain a number of potentially toxic compounds such as ethylene dibromide (EDB). EDB is a carcinogen (cancer causing agent) in laboratory animals, and benzene is considered a human carcinogen.

What can you do?

This worksheet has been designed to provide information on questions you have answered ***Yes*** *to or* ***do not know*** the answer to in the **Assessing Your Petroleum Product Storage Facilities** section of your "Farm and Home Water Quality Assessment." This worksheet will help you develop an Action Plan to establish practices that reduce the risks of contamination to your drinking water supply.

A Partnership Program for Voluntary Pollution Prevention

USDA Natural Resource Conservation Service

USDA Cooperative State Research, Education and Extension Service

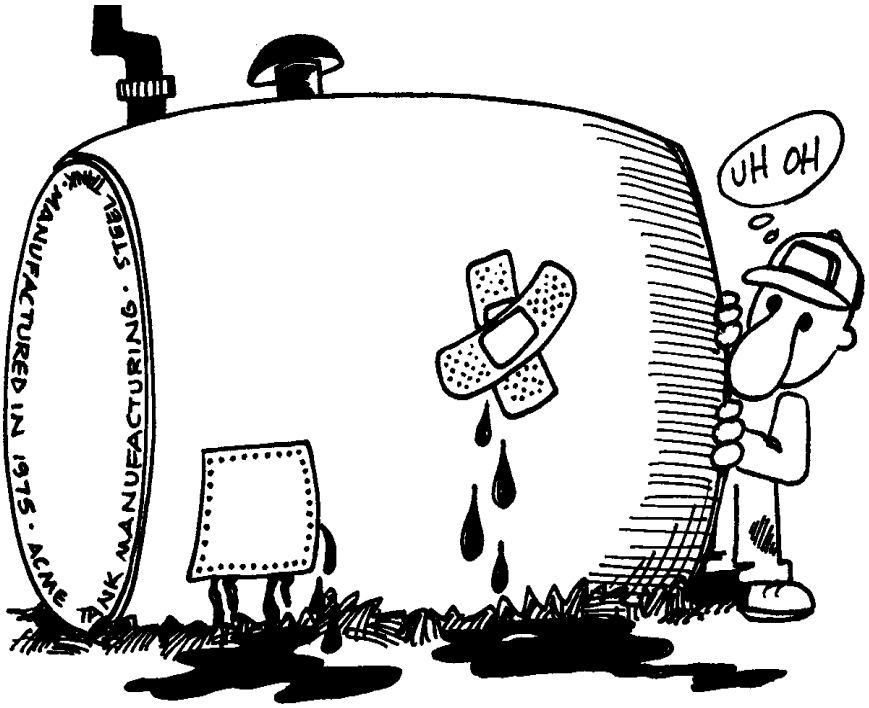
US Environmental Protection Agency

1

Do you have a petroleum storage tank(s) on your property?

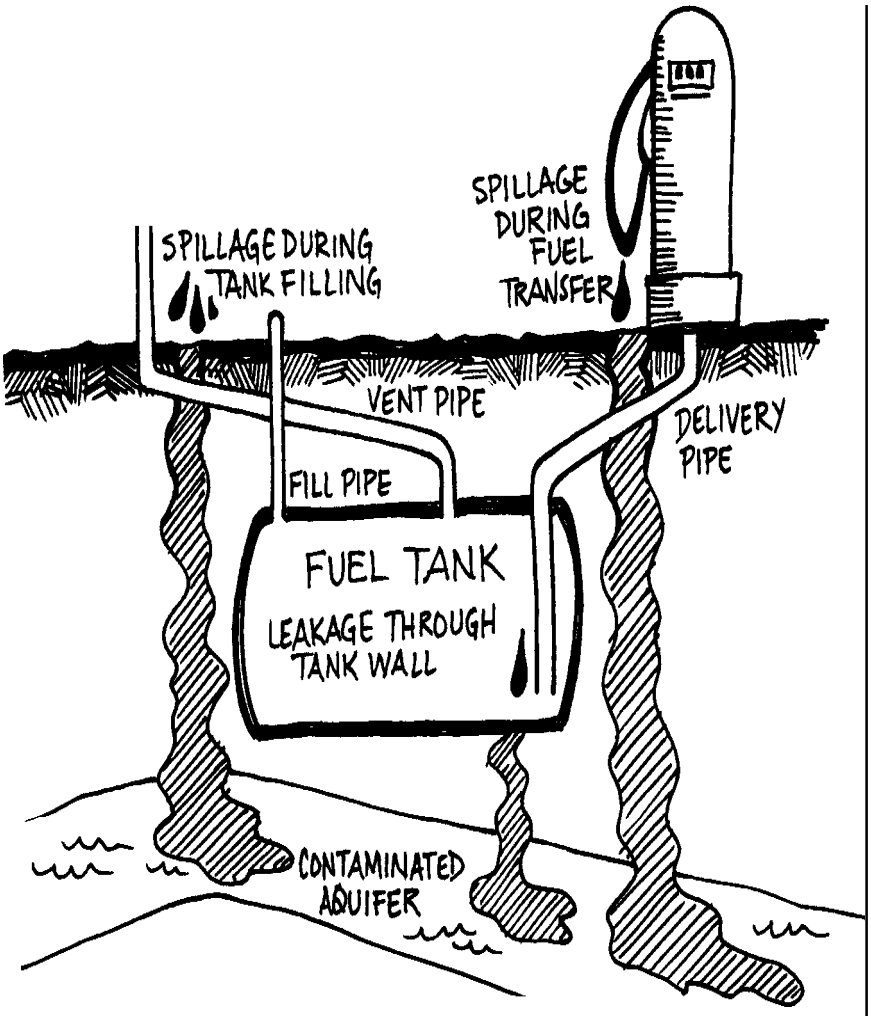
Assessment surveys from other Farm*A*Syst Programs across the country have shown petroleum storage to be the most frequent high risk identified. If you have a petroleum storage tank on your property, you need to assess your storage system to guard against contamination of soil, ground water and surface water.

Tanks that are no longer in use should be removed from the property. Most states/territories have laws and regulations regarding the removal of buried and above ground tanks. Consult with your local regulatory agency before you modify your current system or remove a petroleum tank.



2 Is your petroleum storage tank less than 100 feet from a water supply?

Your petroleum storage system should be located a minimum of 100 feet down slope from your water supply system. This will help protect your water supply from both leaks and spills. Your petroleum storage tanks should also be located at least 25 feet from buildings and heavy traffic areas. State laws on petroleum storage do vary. Check with your local regulatory agency for specific regulations on petroleum storage.



3 Is your storage tank(s) under ground?

Petroleum tanks that have been buried more than 15 years ago present a higher pollution risk to ground water.

Most underground storage tanks are made out of steel and contain little or no protection to prevent corrosion. High corrosive conditions such as saline, wet, or acid soils can significantly increase the rate of corrosion of these tanks.

Most states have regulations regarding the removal of buried tanks. Consult your state regulatory agency on procedures and assistance in the removal of a buried tank.

4 Do you lack protection against leaks or spills from your petroleum storage tanks (i.e., no catch basin or concrete spill pad)?

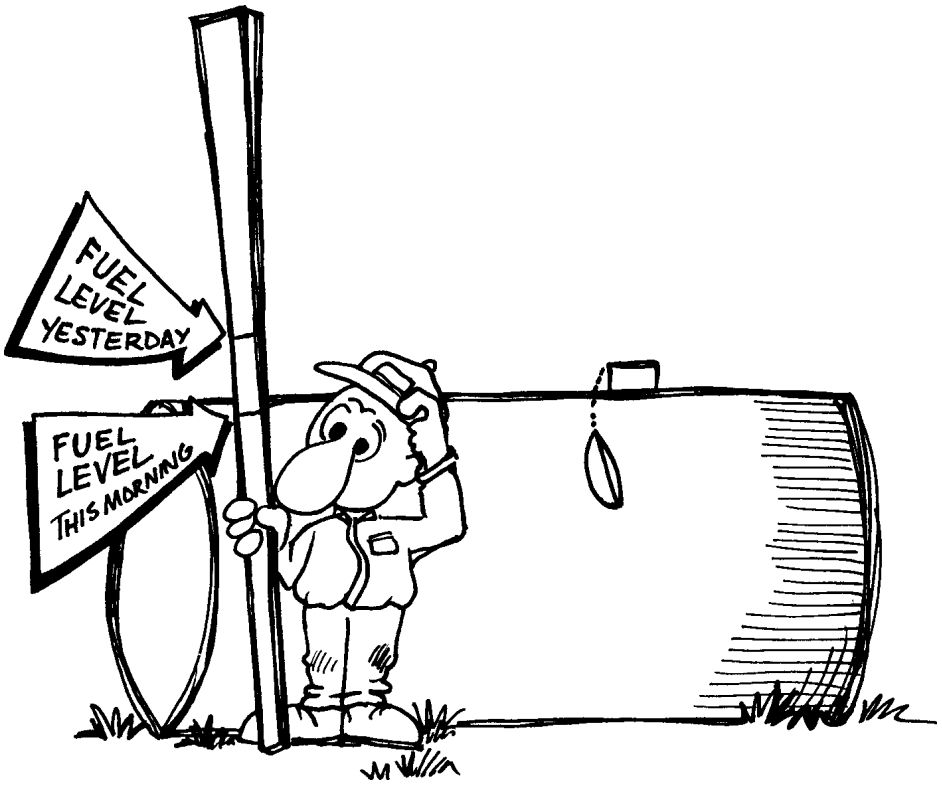
Whether you have under ground or above ground storage you need to develop a system that guards against leaks and spills. Equipment should be fueled on a concrete pad that has secondary containment.

All facilities should be secured from children, pets, and vandalism. Under ground tanks should be protected against corrosion. Above ground tanks should be made of high quality steel and have a secondary containment system that holds 125% of the total volume stored. Tanks that are used or designed for under ground storage should not be used for above ground storage.

5 Do you need to develop a method of recordkeeping to keep track of petroleum use?

Develop a monitoring system to keep accurate records of fuel delivery and usage. Regularly monitoring your fuel use and comparing it to the measured amount of fuel in the tank can help you detect a leak. This is one of the easiest ways to detect leaks in under ground tanks. Monitoring your fuel use does not require a lot of time or money and can help you detect a leaking fuel storage tank before significant losses of fuel occur.

An easy way to monitor your fuel use is to have a pre-marked stick to measure the level of fuel in your storage tank. You need to check the level of fuel in the tank before you withdraw fuel, to make sure the level in the storage tank has not changed since your last use. If the level changes between withdrawals, then your tank may be leaking.



Assessing Your Petroleum Product Storage Facilities

If you answered "Yes" to the following questions.	What to do	Who to call	Other References	What you did
Question 1,5	Develop a regular maintenance program to check tanks for leaks, damage, etc. Install adequate spill and leak protection. Monitor fuel usage.	Local or State regulatory agency.		
Question 2	Plan to move your tank.	Local or State regulatory agency.		
Question 3	Change to above ground storage.	Local or State regulatory agency.		
Question 4	Construct secondary containment system.	Local or State regulatory agency.		

Glossary

Absorption- The act or process of absorbing, the condition of being absorbed or taken in.

Acute health effects - An adverse effect on a human or animal body, with symptoms developing rapidly.

Acute toxicity - The ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Also, any severe poisonous effect resulting from a single short-term exposure to a toxic substance. See also Acute health effects, Chronic toxicity

Aquifer - A soil or rock formation which contains water and is a source that can be pumped for surface uses such as drinking water, irrigation water, etc.

Assess - To evaluate, appraise or determine the condition, in this case, all of the management practices surrounding your drinking water supply and how these practices may affect your drinking water.

Back-siphoning - Drawing liquid from one container to another accidentally when the mouth of the tube or conduit is left below the water surface level. See Check Valve.

Bacteria - Microscopic organisms that live in the soil, water, and organic matter that perform a variety of biological decomposition processes. Bacteria can be beneficial and harmful. Bacteria is the number one source of contamination to drinking water wells.

Bedrock - The solid rock underlying all soil, sand, clay, gravel, and loose material on the earth's surface.

Bentonite - A type of clay that swells tenfold when wetted with water.

Benzene - A clear, colorless, highly flammable liquid made from **petroleum** and used in the manufacture of agricultural products such as detergents, insecticides (DDT), and motor fuels. It was used as an ingredient for some grain fumigants years ago. Benzene is a known carcinogen.

Borehole - The hole that is made from drilling or boring a hole in the ground. A borehole will usually have a small diameter and be very deep.

Caliche - A hard soil layer cemented by calcium carbonate and found in deserts and other arid or semiarid regions.

Carcinogen - Something that can cause cancer.

Catch Basin - A receptacle used to collect or store water.

Cathodic - The negative pole of a battery or other source of electric power. Cathodic protection is the protection of ferrous metals against rust.

Check valve - A valve permitting liquids or gases to flow in one direction only.

Chlorine - A gaseous element used in water purification, as a disinfectant and as a bleaching agent. Used to treat drinking water wells and cisterns contaminated with bacteria.

Chronic health effects - An adverse effect on a human or animal body with symptoms that develop slowly over a long period of time and persist or that recur frequently. See Acute Health Effects.

Chronic toxicity - The ability of a substance to cause long-term poisonous human health effects, usually resulting from repeated doses of or exposures to the substance over a prolonged period of time.

Cistern - A tank for catching and holding liquids (usually rainwater).

Coliform - A group of bacteria that is tested in drinking water systems and used to indicate the cleanliness of the water.

Contaminant - A substance which makes another substance impure or unsuitable for its original use.

Conservation District - A subdivision of state government that addresses land, water and other natural resource problems at the local level. They are managed by local citizens who know local problems and is staffed by professionals from several natural resource agencies.

Corrosion - Dissolving or eating away by a chemical process, i. e., rusting of underground petroleum storage tanks.

Crop Residue - The portion of the crop that is left after harvest has occurred.

Debris - Litter, discarded waste, or remains of garbage.

Degrade - To reduce or lower the quality of something.

Domestic Well - A well for household or private use, usually to supply drinking water.

Drain Field - An area following a septic tank that allows water to percolate through the soil to remove, filter or process bacteria and other contaminants contained in wastewater.

Effluent - The outflow of a sewer, septic system, or other household wastewater discharge.

Erosion - The process in which water or wind moves soil from one location to another. It occurs naturally from weather or runoff, but is often intensified by human activities.

Ethylene Dibromide (EDB) - Fumigant, insecticide or nematicide usually in the form of a wettable powder which is no longer registered in the U.S.

Fecal Coliform Bacteria - Variety of organisms common to the intestinal tracts of man and animals. Their presence in water is an indicator of pollution and potential dangerous bacterial contamination.

Feed Lot - Confined land area for raising animals. Feedlots concentrate large amounts of animal waste in a small area of land.

Galvanized - A coating used on iron or steel to resist rust. It is a source of zinc and other contaminants when the roof is used as apart of a rain water catchment system.

Ground water (also groundwater) - All water below the surface of the land. Ground water usually refers to subsurface water in a zone of saturation that can be pumped from a well or that flows from a spring or seep.

Grout - A thin mortar for filling cracks and crevices in masonry.

Hepatitis - A disease that can result in the inflammation of the liver, it is caused by infectious or toxic agents, and is usually displayed by jaundice and a fever.

Hazardous Products - In a broad sense, any substance or product or mixture of these which have properties capable of producing adverse effects on the health or safety of a human. Included are substances that are carcinogens, toxins, irritants, corrosives, sensitizers, and agents which damage the lungs, skin, eyes, or mucous membranes.

Household Waste Water - Water that is discarded from your kitchen and/or bathroom.

Impervious - Material that does not allow another substance to penetrate or pass through it.

Impermeable - Having a texture that does not permit water or air to flow through easily.

Infiltration - The movement of water into and through the soil.

Laundry Additive- Substance added to laundry detergent to improve performance of cleaning agents

Lead - A heavy, rather soft, malleable metal commonly used for making pipes. Lead used to be in many paint products commonly used in households. It can cause acute and/or chronic health effects.

Microorganism - Microscopic plants or animals, invisible or barely visible to the naked eye.

Nitrates - A necessary compound for plant growth but can produce health risks when excess amounts reach drinking water supplies.

Nonpermeable Material - A material that does not allow the flow of water or another substance through it.

Nurse Tank - Large tank used as a secondary source to provide water, fertilizers, and other agricultural products for use in application equipment, water troughs, etc.

Nutrient Management Plan - Site specific plan that accounts for all nutrient inputs (manure, commercial fertilizers, crop residues, etc.) and outputs (crop harvest, leaching, etc.).

Pesticide - A chemical product used for controlling pests such as insects, weeds, or diseases. **Banned pesticides** are pesticides which have been outlawed by the Environmental Protection Agency (EPA) and/or other regulatory agencies.

Petroleum - An oily, thick, flammable, usually dark-colored liquid that is used in a natural form or a refined form as fuel, or separated by distillation into gasoline.

Restricted Use Pesticides - Pesticide that can only be purchased and applied by a licensed applicator.

Risk- The chance of personal injury or loss, potential impacts from management practices that may cause adverse health affects, contamination of drinking water, and/or adverse effects to natural resources.

Secondary Containment - A container that is used to contain products if there is a leak in the primary container. This could be as simple as portable swimming pool or as elaborate as a concrete pad with walls. It should be minimum of 125% of volume being stored.

Septic System - A system designed to treat household wastewater in which solid organic sewage is decomposed and purified by anaerobic bacteria. Standard components consist of a septic tank and a drain/leach field.

Shackle - A ring or other fastening device, curb or wall.

Stagnant Water - Water that has been settled for a long time without input of additional fresh water.

Sump - A pit or well where water or other liquids are collected; a chamber at the bottom of a machine, pump or circulation system into which a fluid drains before recirculation or in which waste gathers before disposal.

Surface Water - Water that is above ground such as a river or lake.

Toluene - A colorless, water insoluble, flammable liquid used as a solvent in the manufacture of benzoic acid and other organic compounds.

Toxicity - The capability of being toxic or poisonous to either humans, plants, or animals.

Toxins - A chemical or material that can cause acute or chronic health effects.

Virus - An infectious agent which may cause disease when it infects humans, plants or animals.

Well Casing - A pipe or tube constructed of PVC or metal used to line the borehole of a well to prevent contamination of a drinking water supply system.

Xylene - Any of three oily, colorless, water-insoluble, flammable, toxic material used in the manufacture of dyes.

Zinc - A metal used in making galvanized iron, and alloys such as brass and die-casting metal. It can cause acute and/or chronic toxicity in animals.