



Managing Hazardous Materials to Protect Groundwater

Kristine A. Uhlman, Extension Program Specialist–Water Resources

Diane E. Boellstorff, Corresponding Author; Assistant Professor and Extension Water Resources Specialist

Mark L. McFarland, Professor and Associate Department Head, Department of Soil and Crop Sciences

Texas A&M Department of Soil and Crop Sciences, The Texas A&M University System

Some materials that are commonly used around the household and farm can be hazardous if managed improperly. These materials include paints, pesticides, solvents, cleaning fluids, and unused medicines.

Products that contain corrosive, ignitable, reactive, or toxic ingredients are considered hazardous because they can harm people or the environment. Some medications can pollute your water well. To protect groundwater supplies from these hazardous materials, you need to store, use, and dispose of them properly.

It can be dangerous to pour hazardous products down the drain, dump them in a trash pit, or bury, flush, or spill them. Once a hazardous material has been released into the environment, it can quickly seep through the soil and contaminate groundwater, including well water.

Consider the questions in Table 1. If you answer *yes* or don't know the answer to any question, you may have a high-risk situation associated with hazardous waste on your property. Many of these materials can contaminate your drinking water if not managed properly.

The underground water that supplies wells and springs is called groundwater. It

is the source of drinking water for many Texans. Millions of gallons of groundwater may be located under a typical home site, farm, or ranch.

Groundwater can be polluted by materials seeping from septic systems, fuel tanks, livestock pens, and fertilizer and pesticide storage areas (Fig. 1). The decisions you make about maintaining your property can significantly affect your family's health and your drinking water. They can also affect your property values and legal liability.

To use and dispose of hazardous materials safely, always read and follow the instructions on the product labels. Also, check with your city government or county Extension agent about waste collection events.

Water-soluble hazardous materials

A common source of groundwater contaminants is the household septic system. Materials of concern include fertilizers, pesticides, and medications.

Medications such as antibiotics, hormones, antidepressants and pain killers pass through the kidneys and are flushed

Table 1. Questions to help property owners determine whether their water wells are at risk of contamination by hazardous materials.

YES	NO	QUESTIONS
<input type="checkbox"/>	<input type="checkbox"/>	1. Do you store hazardous products (such as fertilizers, pesticides, cleaning supplies, petroleum products, and pool chemicals) closer than 150 feet from your water well or an abandoned water well site?
<input type="checkbox"/>	<input type="checkbox"/>	2. Do you burn trash that is a mixture of chemicals, glass, metal, plastic, or easily combustible dry materials like paper or untreated wood?
<input type="checkbox"/>	<input type="checkbox"/>	3. Do you dispose of the ashes from burned mixed trash within 150 feet of your water well?
<input type="checkbox"/>	<input type="checkbox"/>	4. Do you apply or dispose of building or wood maintenance products such as adhesives, caulks, cleaners, paints, stains, strippers, or thinners within 150 feet of your water well?
<input type="checkbox"/>	<input type="checkbox"/>	5. Do you apply or dispose of used antifreeze or motor oil on your property or in your sewage system?
<input type="checkbox"/>	<input type="checkbox"/>	6. Do you flush or wash your shop floor to clean drip or spill areas?
<input type="checkbox"/>	<input type="checkbox"/>	7. Do you dispose of partially filled pesticide containers on your property?
<input type="checkbox"/>	<input type="checkbox"/>	8. Do you dispose of prescription medicines and personal care products, such as skin and body care materials, in the sink or toilet?

into the septic system drainfield. The active pharmaceutical agents remain dissolved in water and can leach into the groundwater.

Never flush excess drugs down the toilet because they dissolve in water and will seep through the leach field and potentially into groundwater.

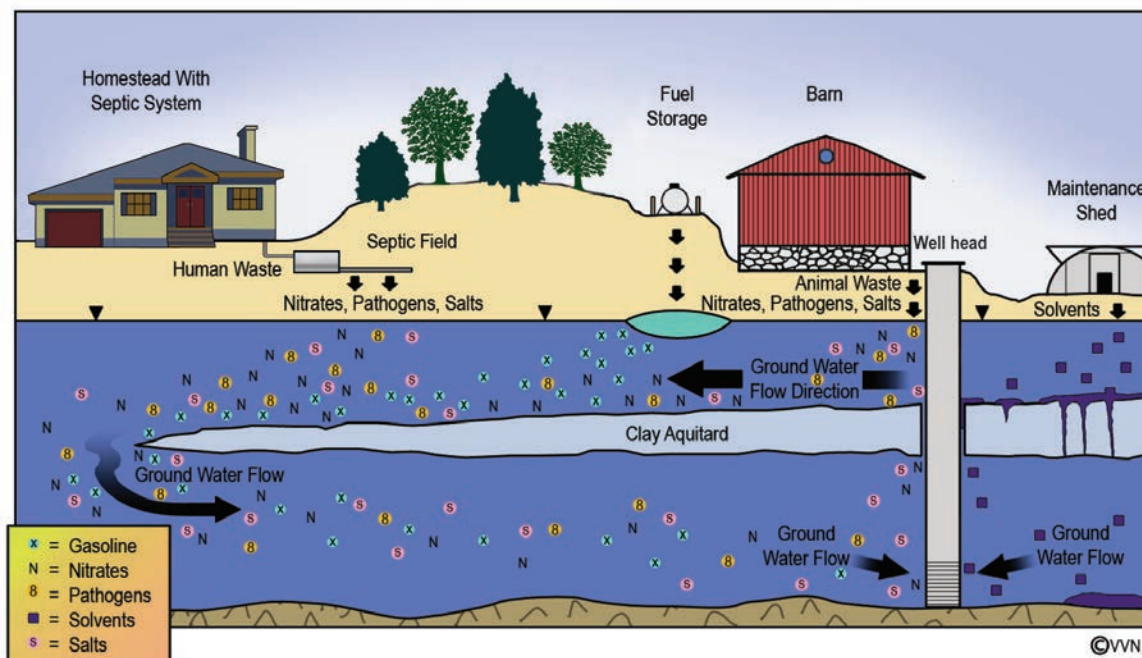
Insoluble hazardous materials

Insoluble liquids (those that do not dissolve in water) that can pollute water include gasoline, oil,

paint thinner, and solvents for cleaning metal parts. Concentrations of only a few parts per million of diesel or gasoline will make water unsafe for human consumption.

Of more serious concern are the insoluble liquids that are heavier than water, such as degreasers, solvents, some pesticides, rust removers, and creosote-based wood treating oils. These chemicals can seep through the soil and leave traces throughout the aquifer.

Figure 1. Common sources of groundwater contamination. Because petroleum fuels are lighter than water, they tend to float to the top of the water table; degreasers and solvents are heavier than water and tend to sink to the bottom of the aquifer.



When solvents come into contact with clay, they change the physical structure of the clay minerals and make the soil more porous, enabling more rapid drainage. A spill on the ground can leach down and contaminate an aquifer.

As little as a few parts per billion of these fluids will pollute the water supply and can damage the aquifer permanently. Never use septic tank degreasers; they can contaminate groundwater and are banned in several jurisdictions.

1. Do you store hazardous products closer than 150 feet from your water well or an abandoned water well?

Store leftover or used chemicals, such as waste oil and solvents, until you can dispose of them properly. The Material Safety Data Sheet (MSDS) will list proper storage and disposal options for the products, spill response, and other health and safety concerns with product use. Good storage practices include the following:

- **Do not store household chemicals, pesticides, wastes, or used bags or other containers in the well house.**
- Store hazardous chemicals and wastes at least 150 feet from your water well.
- Store unused chemicals in their original containers or in clearly labeled containers that comply with the product's label instructions.
- Store chemicals on sturdy shelves in a locked, well-ventilated, flame-free area. Make sure that the area is adequately vented to prevent fumes from building up. If you can smell the product, the area may not be ventilated well enough to protect your health.
- To help prevent chemicals from accidentally escaping and mixing with each other, keep flammables, poisons, and corrosive wastes separate from each other in storage.
- The floor of the storage area should be concrete or asphalt. Even so, spilled solvents may penetrate these surfaces. Clean up spills immediately according to the product label instructions.
- If you store petroleum-based fuels in tanks, they must comply with the Texas requirements for under- and above-ground storage tanks (see AgriLife Extension publication SC-017, *Storing Petroleum Products to Protect Groundwater* at <https://www.agrilifebookstore.org>).

Many communities offer events for collecting hazardous wastes and options for medication disposal. Contact the local health department for information on collection centers and events.

If none are available, take the waste directly to the community landfill. Some pharmacies accept unused medications.

2. Do you burn trash that is a mixture of chemicals, glass, metal, plastics, or easily combustible dry materials?

Although burning may destroy some substances, others will concentrate in the ash, smoke, and sludge, which can pollute groundwater. Do not burn materials repeatedly in the same place.

Toxic substances in the smoke (especially heavy metals such as arsenic, lead, and mercury) can accumulate around the burn barrel or pit. These substances can be absorbed into the soil and move to groundwater. Ash and slush that are spread over or buried in the ground can release toxic substances into well water.

Domestic wastes include kitchen garbage, untreated lumber, cardboard boxes, packaging, clothing, grass, leaves, and branch trimmings. Burning domestic waste outdoors is prohibited everywhere in Texas (Outdoor Burning Rule, Title 30, Texas Administrative Code, Sections 111.201-221), unless the local government with jurisdiction over such matters does not collect trash and does not authorize a business or other service to do so.

Some limited exceptions to the Outdoor Burning Rule include burning waste plant growth when not prohibited by local rule or ordinance and burning crop residues when there is no practical alternative. For more information, see TCEQ Publication RG-049 (<http://www.tceq.texas.gov/publications/rg/rg-049.html>).

Other restrictions and requirements apply to counties that do not meet air quality standards. A list of those counties is posted at <http://www.tceq.texas.gov/airquality/sip>. Local ordinances or county burn bans may also regulate burning.

Items that are not considered to be domestic waste and cannot be burned include appliances, carpet, furniture, tires, construction debris, and electrical wire.

3. Do you dispose of the ashes from burned mixed trash within 150 feet of your water well?

You risk contaminating your water supply if you dispose of ash or sludge from burning mixed wastes within 150 feet of your water well. Collect the ash from burning hazardous waste and take it to a licensed landfill or municipal incinerator.

Only ash produced from dry combustibles—such as brush, paper, and clean, untreated wood—can be spread on fields safely.

4. Do you apply or dispose of building or wood maintenance products within 150 feet of your water well?

Potentially hazardous building and wood maintenance products include finishers, glues, paints, stains, strippers, thinners, varnishes, wood polishes, and non-detergent cleaners. Because farms use so many of these products, even drips and small spills can add up to become a problem for groundwater.

These products should be managed as follows:

- The best ways to dispose of these products are to use up the leftovers completely or share the unused products with others.
- You can allow some leftover household products, such as paints or adhesives, to evaporate in the open air.
- Other products, such as paint thinners, can be filtered and reused.
- Dispose of any liquid or sludge that remains after evaporation or filtration via a waste recycling program, a licensed landfill, or a waste contractor.
- Label wood preservatives and lead-based paints, and dispose of them at a hazardous waste collection event.
- The MSDS will list proper storage and disposal options for the products, spill response, and other health and safety concerns with product use.

5. Do you apply or dispose of used antifreeze or motor oil in your sewage system or on your property?

The first step in protecting groundwater is to properly use and clean up vehicle maintenance products. These include antifreeze, batteries, grease, oil,

oil filters, and rust removers. Use them only on a waterproof surface so you can contain and collect any spillage.

Used oil and oil filters. It is illegal in Texas to dump used oil or oil filters on land, in sewers or waterways, or in the trash or landfills. People who change their own oil must comply with this law.

Used oil may not be used as a dust suppressant. Take used oil and oil filters to an oil collection center operated by a city or a commercial oil-change or auto parts business. Collection centers may also accept antifreeze, batteries, transmission fluid, and other vehicle maintenance products.

To find a nearby collection center, visit Earth911.com or call 1-800-CLEANUP (253-2687).

Do not dump antifreeze or other vehicle maintenance products down the drain, especially if you have a septic tank. These products can kill the organisms that break down waste in the septic system. It is best to take these products to a recycling center or hazardous waste collection event.

6. Do you flush or wash your shop floor to clean drip or spill areas?

Don't repair or maintain equipment within 150 feet of your water well. Conduct maintenance activities where spills and drips can be contained, such as on a concrete pad.

Some people use a grease pit; others allow drips and spills to collect on the floor. In both cases, the area is generally "cleaned" by periodic flushing. Floors cleaned by flushing must include a system to contain the waste liquids so they are not flushed onto the soil.

Another common practice is to use sawdust or another absorbent to soak up drips and spills. Dispose of absorbents, applicators, drop cloths, and other items contaminated with hazardous materials at a licensed landfill or municipal incinerator.

Allow volatile chemicals to evaporate in a protected, outdoor area with good ventilation. Dispose of the resulting sludge or hardened material at a licensed landfill. If you burn any of these substances, it can produce hazardous air emissions and may contaminate groundwater.

7. Do you dispose of partially filled pesticide containers on your property?

If you improperly dispose of partially filled pesticide containers on your property, significant amounts

of pesticides can leak into the soil. Follow the instructions on the product label to dispose of containers and excess chemicals appropriately. The labels also list telephone numbers for questions and emergencies.

Follow the label instructions to comply with the law and to protect your water supply. To reduce the chance of accidentally releasing pesticides to the environment:

- Buy products in returnable containers and return them to the dealer whenever possible. Dispose of non-returnable containers at a permitted landfill.
- Because pesticide residue can be difficult to remove from application equipment, pressure-rinse or triple-rinse the containers according to the product label instructions immediately after use. This rinse water can be reused in mixing subsequent loads.
- Don't bury or burn pesticide bags or containers.
- Participate in the EPA buy-back program for cancelled (banned) pesticides. For information, ask your county Extension agent if the program is available in your area.

8. Do you dispose of prescription medicines and personal care products in the sink or toilet?

Although flushing medicine down the toilet or pouring unused liquids down the sink may have been acceptable and even encouraged in the past, today we are discovering that these are not appropriate disposal methods. Modern wastewater treatment plants are not designed to address medication disposal. And if your home uses a septic system, the chemicals you flush or pour down the drain can leach into your groundwater.

The best way to dispose of these items is at a drug take-back event. The U.S. Drug Enforcement Administration has established the National Take-Back Initiative, which enables residents in many areas to dispose of unwanted medications.

For information on where and when events are scheduled, visit the DEA's website at <http://www.deadiversion.usdoj.gov> and click on the "Got Drugs?" icon.

To reduce the amount of waste you generate:

- Buy only what you need and can use before the product's expiration date.
- Refuse samples from your doctor or other sources (such as store displays or mailing lists) if you do not expect to use them.

- Keep track of the medications and personal care products in your home to avoid buying more than you can use.
- Donate over-the-counter products that have not yet expired to friends, family, or local organizations. However, **never** share prescription medications.

Some pharmacies offer "clean out your medicine cabinet" drives to encourage customers to drop off expired or unused medications and over-the-counter products for disposal. Check with your local pharmacy for options.

Although pharmacies and doctors' offices may be willing to accept these products for disposal, they are not required to do so.

If you have no other options and must dispose of medications or personal care products in the trash, make them undesirable to people and pets. Solidify liquids by mixing them with flour, sawdust, or kitty litter. Solid medications can be crushed or dissolved in liquid before being mixed with sawdust or kitty litter. Seal them in a disposable container and place them in your household trash.

Summary

Always review the product label to know how to use, store, and dispose of any product that may be hazardous. The MSDS also gives information on proper storage and disposal options for the products, spill response, and other health and safety concerns with product use. Do not buy more than you need.

A few simple management principles apply in nearly every situation:

- Keep all chemicals and hazardous products 150 feet or more from your water well and where where any spills and drips will be contained.
- Return excess product, spills, or drips to the original container. Dispose of waste antifreeze, grease, oil, medicines, paint, solvents, and other hazardous chemicals through community collection events.
- Recycle the rinse water from pesticide containers by spreading it on a field or lawn at the proper application rate.
- Contain any unusable drips, spills, and wastes, and dispose of them properly. Check the product label for the appropriate response to spills or other inadvertent releases of the product into the environment.

- Mix and store all hazardous products on a surface that will prevent spilled materials from entering the soil. The cumulative effects of small spills may harm groundwater as much as would a large spill.
- Segregate different types of stored waste to prevent dangerous chemical reactions that could release the products.
- Keep emergency materials and equipment, such as adsorbents and a shovel, ready to contain and collect spills.

For more information

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Photo by Kristine Uhlman, former Texas A&M AgriLife Extension Program Specialist-Water Resources



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