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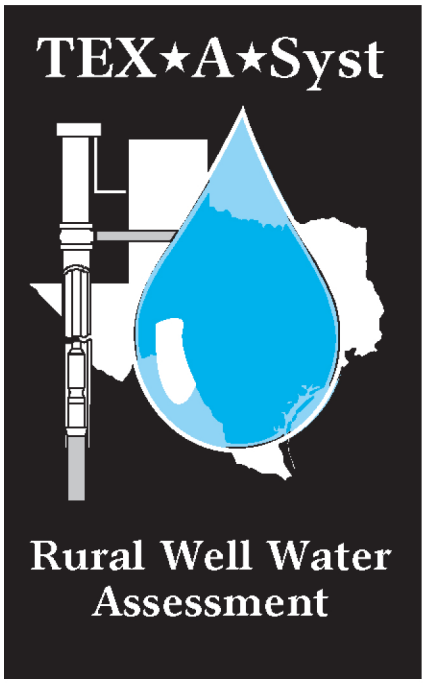

TEXAS A&M AGRILIFE EXTENSION

Reducing the Risk of Ground Water Contamination by Improving Hazardous Waste Management

B.L. Harris, D.W. Hoffman and F.J. Mazac, Jr.*

1. Do you store hazardous products (pesticides, fertilizers, cleaning supplies, petroleum products, summer pool chemicals, etc.) closer than 150 feet from your water well or an abandoned water well site?
2. Have you ever stored hazardous products in an unmarked container or something other than the original container?
3. Do you burn household trash?
4. Do you burn any empty pesticide bags and/or containers?
5. Do you dispose of hazardous household chemicals (such as pesticides, paints, wood stains, cleaners or petroleum products) in your sewage system or on your property?
6. Do you dispose of used motor oil or antifreeze in your sewage system or on your property?
7. Do you periodically flush or wash down your shop floor to clean drip or spill areas?
8. Do you store hazardous wastes generated from equipment maintenance or used batteries?

If these questions create doubt about the safety of your management practices, this publication will provide helpful information.

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Hazardous Waste Management Overview

Consider the variety of products commonly used in households and on farms: paints, solvents, oils, cleaners, wood preservatives, batteries, adhesives, and pesticides. Handling and disposal of excess or unwanted chemicals can become a big problem. Some common disposal practices not only threaten ground water but also may be illegal.

Small, unusable amounts of these products often wind up spilled, buried, dumped, or flushed onto a property. Minimizing the amounts of these substances used on the homestead, along with practicing proper disposal practices, can reduce both health risks and the potential for ground water contamination. Some people are familiar with the hazards of pesticides, but they may be less aware of the hazards of other commonly used chemicals.

Improper use of hazardous products may cause toxic health problems. Improper storage may allow chemicals to leak, causing potentially dangerous chemical reactions, toxic health effects or ground water contamination. Improper disposal may allow these chemicals to enter drinking water through surface water or ground water.

Two key steps to minimizing the risk of pollution on your property from farm and household wastes are to reduce the amount of waste produced and recycle when possible. Hazardous wastes are defined as materials that are ignitable, toxic, corrosive or explosive (TWC, 1990). Lists of hazardous wastes are contained in 40 Code of Federal Regulations (CFR), Part 261.31 through 261.34.

Some hazardous materials, such as lubricating oils or solvents for cleaning metal parts, are an unavoidable part of life. Examine your use of hazardous materials to make sure you really need all the products you are using. Keep in mind that hazardous waste must be managed in accordance with state and federal rules. A glossary at the back of this publication will assist with terminology. This publication focuses on managing hazardous waste and covers the following areas:

1) Hazardous waste use

2) Farm and household waste

3) Household vs. farm business waste

4) Burning

5) Cleaners and chemicals

6) Storage of chemicals and waste

7) Evaluation table

Hazardous Waste Use

Carefully consider how to use products safely. Recycle or reuse them when possible, and dispose of remaining products in a way that will not pose a risk to your drinking water. A few simple management principles apply in every situation:

- ★ Keep hazardous products 150 feet or more from your well and preferably to the side or downhill from it, even when all your spills and drips will be contained.
- ★ Return excess product, spills or drips to the original container. Collect waste paint, solvents, antifreeze, oil and grease, and other hazardous chemicals for community recycling. Dispose of pesticide container rinse water by spreading it on fields or lawns at the proper application rate.
- ★ Contain any unusable wastes, spills and drips for appropriate disposal.
- ★ Locate all hazardous waste products and activities, including mixing and storage, on a surface which will prevent spilled materials from entering ground water. The cumulative effects of small spills may have as great an impact on ground water as a larger spill.
- ★ Segregate different types of waste in storage to prevent dangerous chemical reactions that could release the products.
- ★ Have emergency equipment, such as adsorbents and shovels, ready to contain spills.

Farm and Household Waste

This category of potentially hazardous substances includes the following items:

- ★ Ash and sludge from burned farm, home and garage trash;
- ★ Plastic wraps and containers;
- ★ Personal care products, such as spot removers, dry cleaning fluids, moth balls and shoe and leather polishes;

- ★ Hobby products, artist paints and solvents, undiluted photography and swimming pool chemicals, and strong acids;
- ★ Home cleaning and repair products, such as air fresheners and pest strips; furniture and wood polishes and waxes; paints, stains and finishes; wood-preserving products; and
- ★ Farm business hazardous waste, including unusable or waste cleaners, solvents, pesticides and other hazardous chemicals.

Health concerns, product toxicity and the increased volume of waste guarantees that a new approach to urban and rural disposal practices is necessary to ensure that safe drinking water supplies are available for property owners and their neighbors now and in the future. Updated local, state and federal laws also reflect the increased concern with many disposal practices. For example, new rules require that environmentally protective conditions be met before some disposal practices are permitted. Other previously common disposal practices are now illegal because of their potential risks to human health and the environment.

This new approach suggests several changes in traditional practices, including the following:

- ★ The typical burning site should be eliminated for all but a limited number of needs. Don't dispose of trash on your property, with the exception of organic waste that can be composted (such as household garbage, leaves and straw).
- ★ Recyclable materials should be taken to a recycling facility and uncontaminated trash to a licensed landfill or a municipal incinerator.

Farm and household waste is excluded from hazardous waste management regulations and is often included with regular trash disposal. Neither household hazardous waste nor hazardous waste from a farm can be safely disposed of in a responsibly "pollution-free manner" on private property.

Household Waste vs. Farm Business Waste

Texas law divides hazardous waste into two management categories: waste produced from products used in the home; and waste produced as part of a farm business.

Household quantities of hazardous waste are exempt from regulation under state and federal law. Many communities sponsor household hazardous waste collection events to help users dispose of products safely. For information about locations and dates of collection events, call your county Extension office.

Hazardous waste must be disposed of through a permitted hazardous waste disposal contractor or an agricultural waste pesticide collector, when available. For more information about hazardous waste contractors, contact the hazardous waste section of the Texas Natural Resource Conservation Commission.

Burning

Researchers estimate that ground-level concentrations of 2,3,7,8,-TCDD dioxin resulting from burning household trash in a burn barrel are 7,000 times the amount formed when trash is burned in a municipal incinerator. Ash and sludge from open burning also contain significant amounts of such toxic substances as lead, cadmium, chromium, dioxin and furan compounds.

Texas regulations prohibit the open burning of household garbage, wet combustible rubbish, oily substances, asphalt, plastic or rubber products. Household trash can be burned only in incinerators that meet state air quality regulations.

If not contaminated with other solvents, a furnace designed for burning oil as a fuel can burn waste oil. Contain and dispose of any resulting ash or sludge in a licensed landfill. Waste contaminated with solvents may be a hazardous waste and must be properly managed.

There are no specific design standards to adequately protect the environment from air pollution or ground water contamination resulting from burning and ash disposal of wet trash, plastic containers, waste oil, and other hazardous products used on the farm.

Open burning sites, burn barrels and domestic incinerators do not produce adequate temperatures to eliminate the production of toxic substances such as dioxin compounds, chlorine products, solvent vapors, and a residue of heavy metals.

While burning may destroy some toxic substances, others will become concentrated in the smoke, ash and sludge. Repeated burning at the same location under similar weather conditions may cause the toxic substances in smoke (espe-

cially heavy metals such as lead, mercury and arsenic) to accumulate in a concentrated area around the burn barrel. These substances can in turn be absorbed into the soil and move through the soil to ground water. Ash and sludge disposed of by burying them or spreading them on the land also can release toxic substances into the soil.

Open burning of dry combustibles in small amounts is appropriate if it is permitted by local ordinance. Dry combustibles include clean, untreated, unpainted wood, paper, and cardboard. Burn dry combustibles outdoors or in a well-ventilated area to minimize adverse health effects from smoke.

Empty pesticide bags or other containers should never be burned.

Cleaners and Chemicals

This category of potentially hazardous substances includes:

- Solvent-based building and wood cleaners, including wood polishes and products for cleaning wood floors and panelling. It is important to note that detergent-based cleaners do not pose a threat to ground water.
- Stripping and finishing products, stains and paints, products for brush or spray gun cleaning, and adhesives such as glues and caulk. Also included in this listing of potentially hazardous substances are solvents used in degreasers and paint thinners, stains, varnishes and wood-preservative compounds.

Disposing of these products by dumping them on the ground or in a septic system could allow hazardous constituents to leach to ground water. Farm disposal of any of the products is illegal.

The best disposal method for these products is to use up leftovers or share unused products with others. Allow leftover household products, such as paints or adhesives, to evaporate where and when conditions permit.

Some products, such as paint thinners, can be filtered and reused. Other products, such as wood preservatives and lead-based paints, need to be labeled and saved for disposal by a hazardous waste contractor.

Because of the volume of these products used on the farm, even spills and drips can add up to a problem for ground water. Don't perform equipment maintenance activities within 150 feet of your well. Conduct maintenance activities in a location where spills and drips can be contained, such as on a concrete pad. Evaporate collected drips and dispose of the resulting sludge or hardened material in a licensed landfill.

Disposal of Leftover Pesticides and Containers

Pesticides, including those used for indoor plants and yard care, are referred to as acute hazardous substances because of their extreme toxicity.

Handle all pesticides as directed on the label to prevent health and environmental problems. Pay particular attention to pesticides classified as "restricted use" or state-limited-use. Pesticide labels and regulations concerning their use often change over time. If pesticides have been stored for a while, remember that they might not have current warning labels, and some may even have been banned since the time of purchase.

The only acceptable management practices for pesticides are to use them according to current label directions and arrange for container disposal with a hazardous waste contractor. When the EPA bans a pesticide it sometimes provides a "buy-back" and disposal program for a period of time. If pesticides are purchased in minibulk tanks or returnable containers any excess chemical can be returned. Leftover pesticides that cannot be disposed of in any of these ways should be stored safely until they can be disposed of through a community or state sponsored hazardous waste collection program or a hazardous waste contractor.

Plastic and metal containers should be triple-rinsed or high-pressure rinsed. The rinse water (rinsate) should be added to your pesticide application tank and applied following label instructions. The rinsed containers should then be stored in a dry, secure area until they can be taken to a state sponsored recycling event or licensed landfill. Paper containers should be bundled and taken to a licensed solid waste facility. Check with your local cooperative, retail store or Extension agent to learn whether container recycling opportunities have been arranged.

Due to liability concerns, some landfills will not accept even triple- or pressure-rinsed containers. Triple- or pressure-rinsed pesticide containers may still contain enough pesticide residue that they should not be used for any other purpose.

For additional information regarding pesticide storage, handling and disposal, please refer to the TEX*A*Syst publication, B-6025, *Reducing the Risk of Ground Water Contamination by Improving Pesticide Storage and Handling*.

Vehicle Maintenance Chemicals

This category of hazardous substances includes :

- Vehicle maintenance products, such as antifreeze, oil and grease
- Used oil filters
- Solvents for oil and grease removal and disposal
- Engine, parts and equipment cleaners
- Lubricants
- Rust removers
- Paints and paint preparation products
- Brush or spray gun cleaners
- Lead acid batteries

Oils, fuels and solvents used for cleaning metal parts contain toxic ingredients. Fortunately, there are good recycling opportunities for both solvents and waste oil. Consider renting a parts washer from a solvent recycler. The recycler picks up old solvents and provides you with clean solvent. To recycle waste oil, take it to an oil recycling tank, mechanic or service center. There is usually at least one in every county and often more. Used oil filters also should be turned in for recycling with the waste oil. It is illegal to dispose of them in landfills. It is also illegal in Texas for anyone to throw used oil filters in the trash. Used oil filters must be taken to a collection center. Individuals who change their own oil must comply with this law. Used motor oil and oil filters should be taken to service stations, automotive centers or oil change shops that collect oil for recycling. Filters also can be taken to any registered collection center for proper disposal. Containers with oil should be sealed tightly before delivery to a collection site.

Solid and hazardous waste laws prohibit spreading waste oil on land for dust or weed suppression. Waste oil can be burned in a waste oil burner if the oil has not been contaminated with solvents or other materials. The waste oil furnace should be located according to building code requirements.

Use up old fuels whenever possible. Dilute one part old fuel with five parts new fuel to protect your engine.

Do not dispose of antifreeze in storm drains or sewer systems. It should be recycled or turned in at a household hazardous waste collection center.

If you find yourself painting a lot of vehicles or other equipment, use a paint booth. Some booths are structured to collect excess paint and spray gun cleaners so they can be taken to a solvent recycler. Note that filters used with a paint booth are considered a hazardous waste when discarded.

The design and location of the equipment maintenance area is important. Some individuals 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.

If you prefer to keep your floor clean by flushing, you will need a system to contain waste liquids so that they will not be flushed onto soil. Using sawdust to soak up drips and spills is another common practice. Evaporate volatile chemicals in a protected outdoor area with good ventilation, and take the sawdust to a licensed landfill. Burning any of these substances can produce air emissions that may contaminate ground water.

Evaporation of liquid wastes prior to flushing may take care of the problem of contaminated runoff, but it is not recommended because of air quality concerns and the potential for liquids to seep through cracks in floors. Flushing is one of many past waste management methods that should be re-evaluated to determine whether it is worth the risks of contamination to the environment.

Storage Of Chemicals and Waste

Some activities may result in leftover or used chemicals, such as waste oil and solvents, that need to be stored until disposal. Store these chemicals and their wastes at least 150 feet

from your water well. Dike storage areas to prevent well contamination from spills if the volume of the stored products and wastes exceeds 10 gallons. Store chemicals in clearly labeled containers designed to contain that hazard category (flammables, poisons or corrosives). Store chemicals in a well-ventilated, flame-free area with sturdy shelves. When choosing the storage location, keep indoor air quality, safety, and flammability considerations in mind. Be sure that the area is adequately vented to prevent buildup of fumes from leftover products. As a rule of thumb, if you can smell your products, ventilation may be inadequate to protect your health. Also, to minimize accidental release due to chemical interactions, be sure that flammables, poisons and corrosive wastes are kept separate in storage. **Do not store household chemicals, pesticides, wastes, or used bags and containers in a well house.**

Hazardous wastes generated in the course of maintaining equipment, such as solvents and parts washer solution, must be collected and placed in closed containers and labeled with the words “hazardous waste. The name of the waste and the date that the waste was put into the container also should be on the label. Solvents that are hazardous only because of their ignitability (such as mineral spirits) generally may be mixed with used oil, as long as the solvent content is less than 10 percent of the total volume of the solvent-oil mixture.

Hazardous wastes generated from household vehicle maintenance should be stored safely until they can be taken to a household hazardous waste collection site. For example, batteries may be stored in a plastic-lined area, but some solvents could dissolve a plastic liner. Spilled solvents may also penetrate concrete or asphalt if they are not cleaned up quickly. Some solvents are able to permeate clay soils more rapidly than water, so movement to ground water may be accelerated.

Store flammable chemicals and batteries in an area shaded from direct sunlight. Rags used to clean up solvent spills may also be a fire hazard. Store them with the same care as hazardous materials.

Evaluation Table

The following table can be used to help agricultural producers and rural homeowners determine the risk level that drinking water on a given property may be contaminated as a result of the management practices being used. For each category on the left that is appropriate, read across to the right and circle the statement that best describes conditions on your land. Allow 15 to 30 minutes to complete the table, and skip any categories that do not apply. Note any high risk ratings and take appropriate actions to remedy them. Strive for all low or low-moderate risk ratings.

Hazardous Waste Management: Assessing Drinking Water Contamination Risk

	Low Risk	Low-Moderate Risk	Moderate-High Risk	High Risk
Ash Disposal				
From burn barrel or incinerator	Ash collected and disposed of at licensed landfill or municipal incinerator.	Disposal of ash from dry combustibles only, on private property or at dump, or spread on farm fields.	Disposal of ash from mixed trash on homestead away from well.	Disposal of ash from mixed trash on homestead in consistent location near well or in drainage ways.
Building/Wood Maintenance Products				
Adhesives, such as caulk and solvent-based glues	Used up or shared with someone else. Hazardous waste contractor collection service used for leftover adhesives.	Liquid evaporated in open air. Sludge or leftover product taken to licensed landfill or municipal incinerator.	Disposal at dump.	Disposal on property.

Hazardous Waste Management: Assessing Drinking Water Contamination Risk				
	Low Risk	**Low-Moderate Risk**	**Moderate-High Risk**	**High Risk**
Building/Wood Maintenance Products (continued)				
Brush or spray gun cleansers (solvent based)	Cleaned in contained, ventilated area. Solvent recycler collection services used for leftover cleaners.	Cleaned in contained, ventilated area. Filtered cleaning solvents reused or evaporated in open air. Sludge taken to licensed landfill or municipal incinerator.	Cleaned in uncontained, ventilated areas and used cleaning solvents disposed of at dumps.	Disposal of leftover cleaning solvents on property.
Lead-based paint	Hazardous waste contractor collection service used.	Liquid evaporated in open air. Paint or sludge taken to licensed landfill or municipal incinerator.	Disposal of sludge or paint at dump.	Disposal on property.
Paint or stain (no lead)	Used up or shared with someone else. Hazardous waste contractors used for leftover paint or stain.	Liquid evaporated in open air. Paint or sludge taken to licensed landfill or municipal incinerator.	Disposal of oil-based paints or stains at dump. Latex paint disposal on property away from well.	Disposal of oil-based paints or stains on property.
Stripper or thinner for paint/finish	Spills contained. Unused products used up. Hazardous waste contractor collection services used for leftover stripper or finish.	Liquid evaporated in open air. Stripper or stripper sludge taken to licensed landfill or municipal incinerator.	Disposal of sludge, stripper or thinner at dump.	Disposal on property.
Surface cleaners (solvent based)	Used up or shared with someone else. Hazardous waste contractor collection service used for leftover cleaners.	Liquid cleaners evaporated in open air. Cleaners or sludge taken to licensed landfill or municipal incinerator.	Disposal of sludge or cleaners on property.	Disposal of triple- or pressure-rinsed containers on property.
Container Disposal				
Paper/cardboard pesticide containers	Returned to supplier or hazardous waste collection service used.	Empty container taken to licensed landfill, municipal incinerator or dump.	Disposal of empty containers on property.	Disposal of partially filled containers on property.
Plastic or metal pesticide containers	Triple- or pressure-rinsed containers returned to retail store for reuse or taken to licensed incinerator or recycled. Rinsate applied to appropriate crop.	Disposal of triple- or pressure-rinsed containers on property.	Disposal of empty but unrinsed containers on property.	Disposal of partially filled containers on property.
Plastic containers for oil or other vehicle product, oil filter	Product used up and containers recycled.	Any remaining ingredients evaporated in safe conditions. Empty containers taken to licensed landfill or municipal incinerator.	Disposal of empty containers at dump or on property.	Disposal of partially filled containers on property.
Household hazardous product containers	Taken to recycling facility or reused for similar products.	Empty containers taken to licensed landfill, municipal incinerator or dump.	Disposal of empty containers on property.	Disposal of partially filled containers on property.

Hazardous Waste Management: Assessing Drinking Water Contamination Risk				
	Low Risk	**Low-Moderate Risk**	**Moderate-High Risk**	**High Risk**
Pesticides				
Unwanted or banned pesticides	Participation in EPA banned pesticide buy-back program if available. Unused pesticides taken to place of purchase. Hazardous waste contractor collection serice used. Turned in during Texas Amnesty Day Program.	Pesticides sold for restricted or general purpose used up or taken to licensed landfill or municipal incinerator.	Disposal of unused pesticides at dump.	Disposal of unused pesticides on property.
Vehicle/Metal Equipment Maintenance Products				
Used antifreeze	Saved and taken to antifreeze recycling facility or filtered and reused as water in other radiators.	Collected and disposed of at municipal sewage treatment drain with permission of municipality. Taken to licensed landfill, municipal incinerator or dump.	Disposal on property away from the well (including the septic system).	Dumped near well.
Waste oil, grease and used oil filters	Taken to used oil collection tank for recycling or local cooperating service station.	Reused for lubrication. Burned for heat in an approved residential incinerator or collected and disposed of at licensed landfill or municipal incinerator.	Disposal at dump.	Disposal on property.
Waste oil sludge (left over after burning)	Hazardous waste contractor services used.	Collected and disposed of at a municipal incinerator.	Disposal at dump.	Disposal on property.
Spent organic solvent/parts cleaner	Solvent recycler collection service used for leftover cleaners.	Filtered in ventilated area and reused or evaporated in open air. Sludge taken to licensed landfill or municipal incinerator.	Disposal of solvents or sludge at dump.	Disposal of solvents or sludge on property.
Rust-removal products	Used up or shared with someone else. Hazardous waste contractor service used.	Taken to licensed, municipal incinerator or landfill.	Disposal of leftover product on property.	Disposal of used product on property.
Lead acid battery	Taken to battery recycler or battery store.	Used batteries taken to licensed landfill or municipal incinerator, or stored away from well.	Used batteries taken to dump or stored near well.	Disposal on property near well.
Vehicle maintenance drops and spills	Contained on paved area with sawdust. Contaminated sawdust disposed of at licensed landfill or municipal incinerator.	Contained on paved area with sawdust. Contaminated sawdust disposed of at landfill.	Occasional flushing onto property near well.	Frequent flushing onto property near well.

Hazardous Waste Management: Assessing Drinking Water Contamination Risk				
	Low Risk	**Low-Moderate Risk**	**Moderate-High Risk**	**High Risk**
Wood Preserving				
Application drips and spills	Drips and spills contained. Applicator and drop cloths disposed of at licensed landfill or municipal incinerator.	Drips and spills contained. Applicator and drop cloths disposed of at landfill.	Application without containment more than 100 feet from well. Applicator and drop cloths disposed of on property.	Application without containment within 100 feet of well.
Disposal of unused preservatives	Used up or shared with someone else. Hazardous waste contractor collection service used for left-over preservatives.	Disposal at licensed landfill or municipal incinerator.	Disposal at dump.	Disposal on property.

Glossary

Burn barrel: Any on-property system of open burning, such as burning in a barrel. (See incinerator.).

Dump: A local landfill that is not designed to prevent leaching and offers little ground water protection.

Farm business: A farm that generates at least $1,000 in net annual income from farming.

Hazardous waste contractor: A hazardous waste collection service offered by businesses with vehicles licensed to transport hazardous waste to licensed hazardous waste facilities.

Household hazardous waste collection program: A special program in which a community collects waste for disposal in a specially constructed hazardous waste landfill or incinerator.

Household quantities: Less than 5 gallons of a household product.

Incinerator (municipal): A community incinerator specifically engineered to burn municipal quantities of home waste.

Licensed landfill: A landfill specifically designed to protect ground water through the use of a high quality clay or clay/impermeable film liner, accompanied by a system of buried pipes to collect any liquids generated. Meets current state and national standards for household solid waste landfills.

On-farm disposal: Any method of burning, dumping or land spreading of wastes on the farm. Also includes use of the septic system for disposal.

Recycling: Reusing waste materials to develop another product.

Solvent recycler collection service: A service provided by businesses to reprocess used solvents.

Contacts and References

For additional information contact your local county Extension agent, or:

- The Texas Natural Resource Conservation Commission at (512) 239-1000,
- The Texas Agricultural Extension Service Water Quality unit (409) 845-0887,
- Texas State Soil and Water Conservation Board, (817) 773-2250.

Internet addresss: TEX*A*Syst bulletins and links to other water quality sites are contained in a homepage located on the World Wide Web at: http://waterhome.tamu.edu.

TEX*A*Syst is a series of publications to help rural residents assess the risk of ground water pollution, and to describe Best Management Practices (BMPs) that can help protect ground water. The TEX*A*Syst documents were developed from the national Farm*A*Syst ground water protection program. The TEX*A*Syst system is designed to help the user learn more about the environment, existing environmental policies and regulations, and recommended management practices. Thus, the user can voluntarily reduce the pollution risks associated with water wells.

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