FARMSTEAD POLLUTION PREVENTION U·P·D·A·T·E

NEWS ABOUT FARMSTEAD ASSESSMENT FOR GROUNDWATER PROTECTION OCTOBER 1991

Farm*A*Syst Program Expanded Nationally

Reports of rural groundwater contamination are coming in from across the nation. The news is of great public concern—groundwater is the source of drinking water for nearly all of the rural population. Here's just a sample of what we're hearing:

A recent study conducted in Kansas suggests that farmstead activities and structures may often cause pesticide and nitrate contamination in rural well water. In Iowa, a 1989 survey of rural wells showed that almost half of the wells tested had unsafe levels of coliform bacteria. In many other states, well water testing programs are consistently identifying wells with elevated nitrate levels, bacteria, pesticide or volatile organic chemical contamination.

Hits Ground Running

Rural residents across the U.S. are looking for ways to help keep their water supplies clean. A new program that can help meet this urgent need is Farm*A*Syst, a voluntary farmstead groundwater pollution potential assessment program. The Farm*A*Syst program uses easy, step-by-step assessments of each farmstead activity or structure that could cause contamination. The assessment also rates soil and geological features of the farmstead and gives an overall picture of the potential water quality problems at the evaluated site. The information gathered from the assessments is used to recommend actions for protecting rural groundwater on that particular site. The program also provides information on the financial, educational and technical support available.

This program, developed and tested by the Universities of Wisconsin and Minnesota, is being expanded nationally so that all states will be able to adapt the prototype Wisconsin materials and start their own Farm*A*Syst program.

U.S. Farmstead Pollution Prevention Center

The national Farm*A*Syst staff is comprised of University of Wisconsin–Extension Professor Gary Jackson, Susan Jones from EPA Region V and a soon-to-be-assigned SCS staff person. This interagency support team will be located at the University of Wisconsin, Environmental Resources Center.

The national program will provide guidelines and educational support to states interested in adapting Farm*A*Syst to their own needs, establishing their own Farm*A*Syst programs and integrating farmstead pollution prevention assessments into existing water quality protection programs.

Plans are to initiate one or more national workshops early next year to help train local, state, and federal agency staff in the modification and use of the Farm*A*Syst program. Look for more information on the specifics of these workshops in future newsletters.

A national interagency committee will be established to guide the National Farm*A*Syst program and its refinement based on implementation experience.

Support for this national expansion is being provided by the U.S. EPA, USDA Extension Service and Soil Conservation Service.

Farm*A*Syst can provide a formidable defense against rural groundwater contamination from farmstead sources. **If you would like more information on Farm*A*Syst, contact the national staff at 608-262-0024.**

Fall 1991

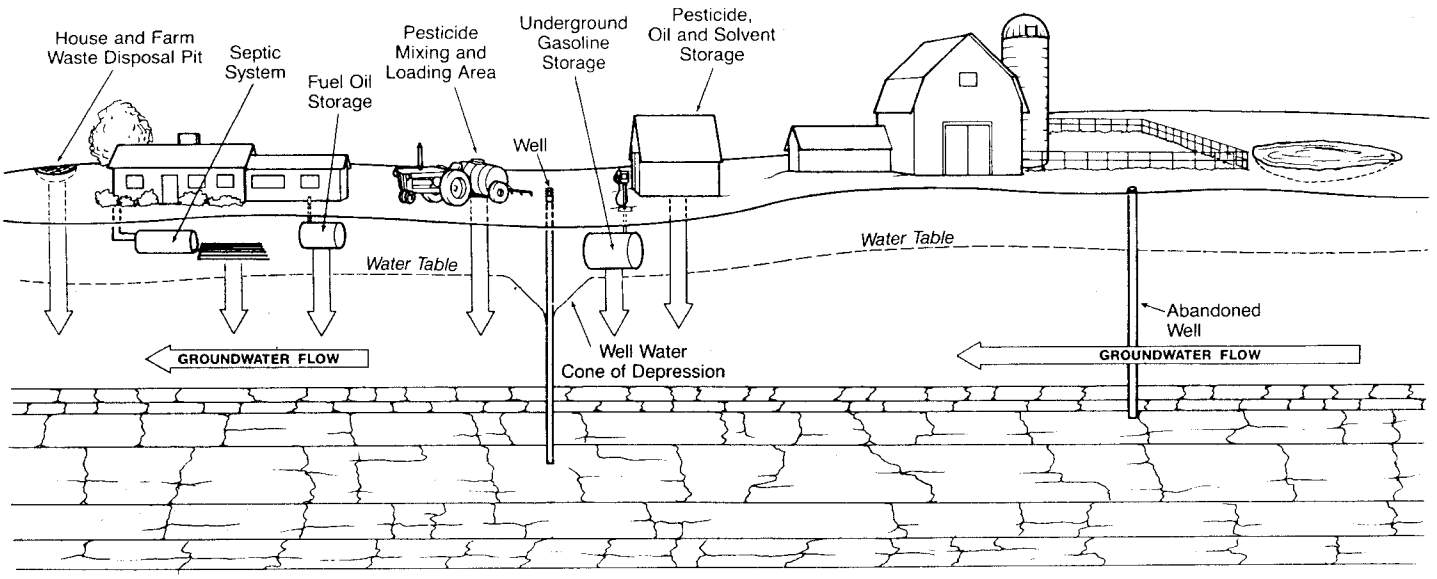
- Share Farm*A*Syst program with states
- Set up committees, interagency cooperation

Winter 1992

- Conduct regional training workshops (Procedure Manual Available)
- Share program evaluation guidelines

Farm*A*Syst National Activities

Farmstead Sources of Toxic Contaminants



This illustration identifies possible farmstead sources of toxic contaminants. If these materials are not handled and stored properly, they can contaminate the groundwater that supplies the farm drinking water. The farmstead well is often very vulnerable to contamination because of its close proximity to these potential toxic sources.

Many every day farm activities involve toxic chemicals that could cause groundwater contamination. Routine use of these necessary farm chemicals sometimes makes it easy to forget the potential impact they could be having on rural groundwater. But proper handling, storage and disposal techniques can reduce or eliminate the risk to groundwater contamination.

To illustrate the pollution potential of many farmsteads, ag experts have developed a hypothetical two-acre farm model. This typical farmstead includes 100 dairy animals (50 cows, 50 replacement heifers) and is the base of operation for 200 cropland acres and a family of five. The aquifer (the underground area where water is found) under the farmstead is 100 feet thick and is about 30 percent porous, or water permeable. Approximately 19.5 million gallons of groundwater is under the farmstead. The following estimates are based on the number of pounds of toxic materials that may be handled in a typical year at a hypothetical two-acre farmstead.

Pesticide Storage

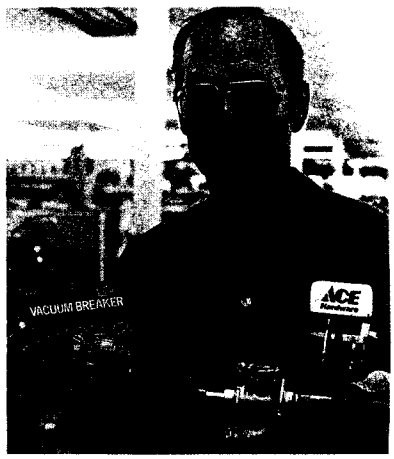
If atrazine is used at two pounds per acre, about 200 pounds of active ingredient may be handled and stored at the farmstead in a typical year.

A "small spill" of two pounds on a one- to 50 sq. ft. area can concentrate the active ingredient normally applied to an entire acre (43,560 square feet). If this area is close to the well, it could cause direct contamination of the well. This same two pounds can cause 80 million gallons of water to exceed the drinking water national health advisory level of three parts per billion.

Most farmers who apply their own pesticides will use several types of herbicides and insecticides to effectively control pest problems. When pesticides are custom-applied or mixed and loaded in the field, little or no pesticides are handled around the farmstead, thus eliminating this risk.

For convenience, pesticide mixing and loading areas are often in close proximity to farm wells. In many cases, no designed backflow devices are used. Both of these situations present significant groundwater and drinking water pollution risk, but can be easily avoided.

Anti-backflow devices are available in most hardware stores and cost $5 to $20. Most are easy to install and require essentially no maintenance.



Pesticide storage areas can be the site of major contamination problems from accidental spills or during catastrophic events such as fires. If fire departments are unaware of where hazardous materials are stored and use volumes of water to control the fire, significant contamination problems can result, along with extensive cleanup costs. Proper identification of storage areas can prevent this problem.

Petroleum Storage

In the same farmstead used as a model, about 1,200 gallons of gasoline, 2,500 gallons of diesel fuel and 600 gallons of fuel oil are used in a year. Storage tanks for these substances have become a significant source of groundwater contamination. Underground storage tanks, in particular, are of concern—especially if they are older than 15-20 years. And since these tanks are underground, leaks are often undetected until the petroleum product contaminates the groundwater.

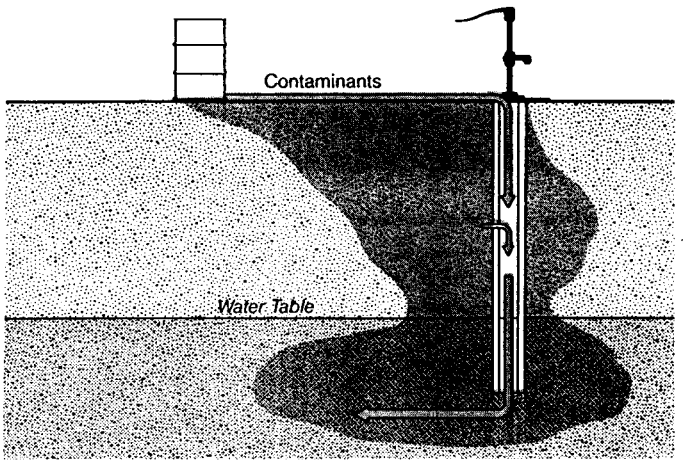
Toluene, xylene and benzene and some additives found in petroleum products may pose significant health risks. The groundwater standard for benzene is five parts per billion (PPB), so one gallon of gasoline containing 1 percent benzene can contaminate about two million gallons of groundwater.

One part per million can be imagined as one red marble mixed in with 999,999 blue marbles. *One part per billion* is the same as eight drops of water in an Olympic-sized swimming pool. Although such small numbers may seem quite insignificant, even one part per billion or less of certain chemicals can be dangerous to your health.

Household and Farmstead Hazardous Waste

Studies have shown that the average household produces about seven pounds of hazardous waste per year. Little has been done to quantify groundwater problems caused by the wide range of toxic chemicals used in homes. Drinking water standards allow only a very small ratio of chemicals in drinking water for safety, meaning that very small amounts can contaminate a large volume of groundwater.

Some building and vehicle maintenance products containing organic solvents can, if improperly disposed, contaminate groundwater. These products may contain toluene, xylene, benzene and trichloroethane, or "petroleum distillates."



Adapted from a graphic by Rex Heer and Iowa State University.

Contaminants can flow directly into old, unused wells, contaminating nearby drinking wells.

Household and Farmstead Waste Disposal

Many areas of the country are closing local dumps or landfills because of improper design and groundwater leaching problems. This has spawned another dilemma, since rural landowners have often resorted to home waste disposal sites, sometimes located dangerously close to wells.

Toxic compounds, when disposed of in septic systems, may also move to groundwater and contaminate it. Some states, including Wisconsin, classify agricultural waste as industrial waste, making it illegal to bury these wastes on the property. Well-engineered landfill sites and effective collection systems that adequately serve the rural community can reduce inappropriate waste disposal, however.

Well Vulnerability to Toxic Contamination

Numerous factors influence a well's vulnerability to toxic contamination. These factors include the distance between the well and the source or sources of contamination; the amount of contaminant which has been dumped, spilled or improperly disposed; the design of the well including the age, depth of casing and integrity of the grout seal around the well casing; the pollution vulnerability of the soil and bedrock at the well site; and the presence of direct channels of flow from the contamination source to groundwater (such as abandoned wells and sink holes).

Once most contaminants have moved below the normal rooting zone of plants, they will break down quite slowly because of the reduction in microbial organisms, cooler soil and water temperatures, and the absence of light.

Even if wells currently test as contaminant-free, spills that occurred a long time ago could eventually show up in these wells, due to the distance some contaminants must travel. In other words, we may not know for many years to come the full impact of the contamination we may have caused.