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K-STATE Kansas State University

FARM•A•SYST
Farmstead Assessment System

Fact Sheet 1

Reducing the Risk of Groundwater Contamination by
Improving Drinking Water Well Condition

1. Well location

Whether a well taps water just below the ground or hundreds of feet deep, its location on top of the ground is a crucial safety factor. Locating a well in a safe place takes careful planning and consideration of such factors as where the well is in relation to surface drainage and groundwater flow. A well downhill from a livestock lot, a leaking tank or a failing septic system runs a greater risk of contamination than a well on the uphill side of these pollution sources. The general rule for protecting the water supply is to keep a well upslope and as far as possible from potential sources of contamination.

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

Separation distances

Many states encourage good well location by requiring minimum separation distances from sources of potential pollution, thus using the natural protection provided by soil. Kansas well regulations (K.A.R. 28-30-8) require that new wells be constructed a minimum of 50 feet from all potential sources of pollution or contamination. In addition, Kansas Department of Health and Environment (KDHE) design standards for livestock feeding operations require a minimum of 100 feet separation between any pollution source associated with a livestock operation and water supply wells. In many Kansas counties, the local health department or planning and zoning department may have specific regulations requiring greater separation from some potential contamination sources.

There is no specific distance that will guarantee the well will not be affected. Make every effort, however, to provide as much separation as possible between your well and any potential contamination source—especially if your farmstead is on highly permeable soils or thin soil overlying limestone bedrock, or if the contamination source or activity presents a high risk of contamination.

Both soil and slope can make siting a well a tricky business. Keep in mind that separation distances required by the state are minimums. You may want to choose greater separation distances in some cases, depending on factors at your site. Results of a recent Kansas farmstead well study indicate that the distance to any potential contamination feature must be at least 200 to 400 feet to provide reasonable assurance that the well will be protected. The greater the amount of activity within 400 feet of the well, the greater the chances of contamination of the well water. All surface runoff should be diverted away from the well. Consider contamination sources on adjacent properties as well.

For glossary, see page 2 of Worksheet 1.

Changing the location of contamination sources in relation to your well may protect your water supply, but not the groundwater itself. Any condition likely to cause groundwater

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contamination should be improved, even if your well is far away from the potential source. Whether or not drinking water is affected, groundwater contamination is a violation of Kansas law.

Simply separating your well from a contamination source may reduce the chance of pollution, but it does not guarantee that the well will be safe. Stormwater and groundwater can carry bacteria, oil products and pesticides from one place to another. Wells located in the path of that water run a risk of contamination from overland flow washing into an improperly sealed well. Some wells become contaminated through polluted recharge at great distances, depending on the depth of the aquifer and the well intake.

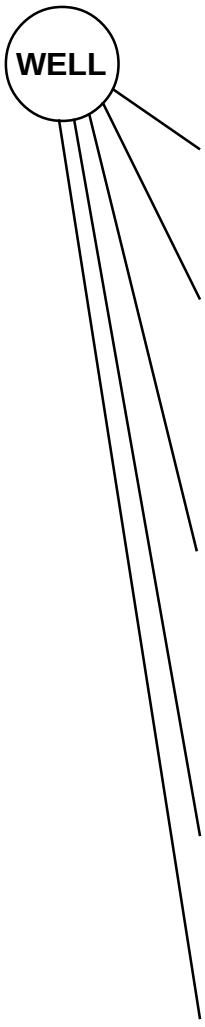

Figure 1: Separation Distances and Chance of Well Contamination

Less than 50 feet	• very high chance of nitrate, pesticide and volatile organic chemical (VOC) contamination • moderate to high chance of bacterial contamination
50–100 feet	• Kansas well regulations (K.A.R. 28-30-8) require a minimum separation of 50 feet between any potential contamination source and water supply wells • moderate to very high chance of nitrate, pesticide and VOC contamination • low to moderate chance of bacterial contamination
100–200 feet	• Kansas Department of Health and Environment design standards require that all potential water pollution sources associated with livestock lots be at least 100 feet from water supply wells • moderate to high chance for nitrate, pesticide and VOC contamination • very low to low chance for bacterial contamination
200–400 feet	• low to moderate chance for nitrate, pesticide and VOC contamination • very low chance for bacterial contamination
Greater than 400 feet	• very low chance for contamination of the well water

These distances will provide the relative amount of safety from contamination as described. In addition to federal and state regulations, **follow all local ordinances and provide as much separation as practical when locating either a well site or source of potential contamination.**

Sources: Kansas Administrative Regulations, K.A.R. 28-30-8, effective May 1, 1987.
Kansas Farmstead Well Contamination Factor Study, Phase 2, Part II, Koelliker, et al, 1991.

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2. Well Construction

Poor well design can allow contamination by letting rain or snowmelt reach groundwater without filtering through the soil. Wells located in pits, or without grout or a sanitary well seal, can allow surface water to carry bacteria, pesticides, fertilizer or petroleum products into your drinking water supply. Proper well design reduces the risk of pollution by sealing the well from anything that might enter it from the surface (Figure 2).

The way in which a well is constructed, even if the design is sound, affects its ability to keep out contaminants. Several things that should be checked are described in the following sections. Well construction information may be available from the person who drilled your well, from the previous owner, or from the well construction report. The Kansas Department of Health and Environment in Topeka, or the Kansas Geological Survey in Lawrence can attempt to locate the construction report for you.

The following overview of well construction and inspection can help you understand your drinking water contamination risk ranking. For more information, contact a well driller licensed by the state of Kansas. Your KDHE district water supply specialist can help interpret construction requirements of the private well code (K.A.R. Article 30).

Casing, grouting, pitless adapter and well seal

The well driller installs a steel or plastic pipe (casing) during construction to prevent collapse of the borehole. All openings in the casing should be sealed, and if water pipes exit through the side of the casing, they must do so through an approved fitting called a pitless adapter.

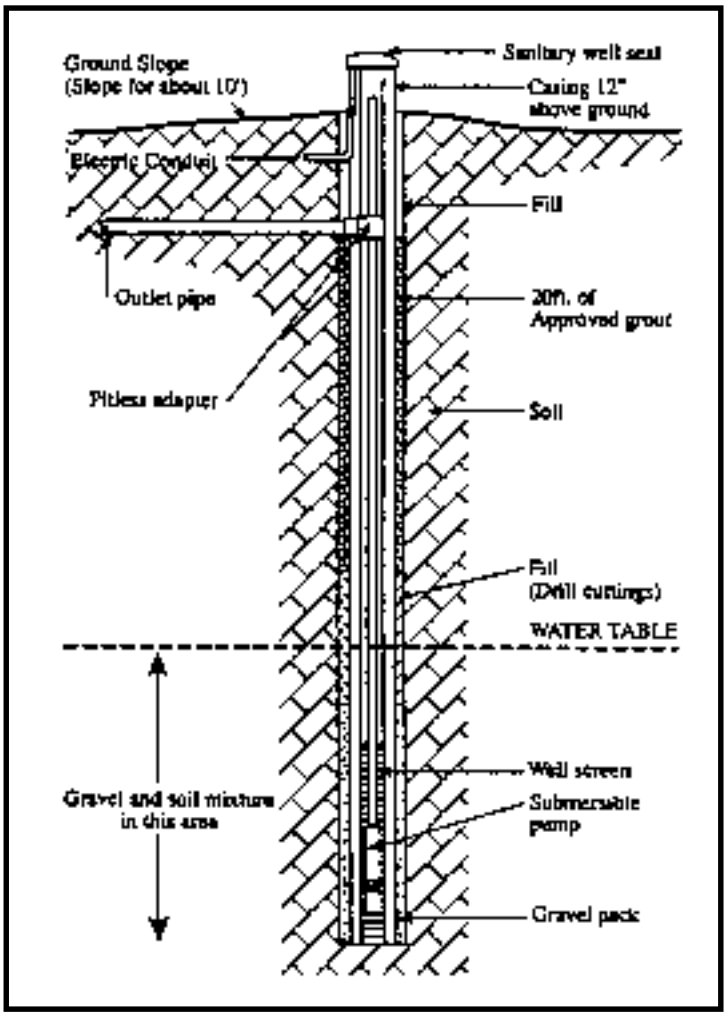

Figure 2: Required construction components for new wells.

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The space between the casing and the sides of the borehole provides a direct channel for surface water—and pollutants—to reach groundwater. To seal off that channel, the driller fills the space with grout (cement, neat cement or a special type of clay called sodium bentonite). The grout seal should extend at least 20 feet in depth from the surface or pitless adapter. Grouting should seal the casing within confining layers and can stop at the confining layer or water table if either is less than 20 feet below the surface. The grout seal, pitless adapter and casing help to prevent pollutants from seeping into the well. The ground surface should slope away from the well in all directions.

You can visually inspect the condition of your well casing for holes or cracks at the surface and down the inside of the casing with a light. If you can move the casing around by pushing against it, you may have a problem with your well casing's ability to keep out contaminants. In areas of shallow (less than 20 feet from surface) fractured bedrock, check on the condition of your well casing by listening for water running down into the well (pump should not be running). If you do hear water, there could be a crack or hole in the casing, or you are not cased down to the water level in the well. Either situation is risky.

To prevent contaminants from flowing down inside the well casing, the driller installs a tight-fitting, vermin-proof well seal to prevent easy removal by children, and entry by insects or surface water. The seal should be firmly installed, with a screened vent incorporated into it so that air can enter the well. Check the well seal to see that it's in place and tightly secured. Electrical wires entering the well should be in an approved conduit. If your well has a vent, be sure that it faces the ground, is tightly connected to the well seal, and is properly screened to keep insects out. Well regulations require a vermin-proof seal for all private wells. (Not all wells have seals. Some may have pumping equipment attached or may be open at the surface.)

Casing depth and height

The minimum depth of casing required for your well is stated in Kansas regulations. All wells are required to have a durable, watertight casing extending to the top of the water producing aquifer. In no event should this watertight casing extend less than 20 feet below ground level. This ensures that water is filtered through soil and geologic materials before entering the well.

You may want to consider exceeding the minimum casing depth. Since most contamination comes from the surface, casing the well deeper can provide greater protection. At the same time, deeper cased wells can result in aesthetic water problems caused by dissolved solids, such as hardness and iron.

Typically, the casing extends one to two feet above surrounding land, preventing surface water from running down the casing or on top of the seal and into the well. Kansas well regulations require that at least 12 inches of casing pipe extend above the final grade of the land. In areas subject to flooding, the casing must be extended a foot above the estimated flood elevation, but such well locations are discouraged.

Well age

Well age is an important factor in predicting the likelihood of high nitrate concentrations. A well constructed more than 70 years ago is likely to be at the center of the farmstead; it may be a shallower well and is probably surrounded by many potential contamination sources. Older well pumps are more likely to leak lubricating oils, which can get into the well. Older wells are also more likely to have thinner casing that is corroded through. Even wells with modern casing that are 30 to 40 years old are subject to corrosion and perforation. If you have an older well, you may want to have it inspected by a licensed well driller.

Well type

Dug wells pose the highest risk of allowing drinking water supply contamination because they are shallow and often poorly protected from surface water. A dug well is a large-diameter hole (typi-

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cally three to six feet wide), which is often constructed by hand and lined with rock or brick. Hand-dug wells as small as two feet, and larger than 30 feet, are known to exist. Dug wells will usually be 15 to 50 feet deep.

Driven-point (sand point) wells are constructed by driving assembled lengths of pipe into the ground. These wells are normally small in diameter (two inches or less) and less than 50 feet deep. They can only be installed in areas of loose soil, such as sand. Since these wells are not grouted they do not meet current well construction requirements.

Drilled wells refer to all other types of wells, including those constructed by a combination of jetting and driving. Drilled wells are commonly 4 to 10 inches in diameter. Depth will vary depending on the aquifer, and can be over 300 feet. These are the most common type of well in Kansas.

Well depth

Shallow wells draw from the groundwater nearest the land surface, which may be directly affected by farmstead activities. Depending on how deeply the well is cased below the surface, rain and surface water soak into the soil and may carry pollutants into the well.

Local geologic conditions determine how long it takes for this to happen. In some places, this process happens quickly, in weeks, days or even hours. Areas with thin soil over fractured bedrock or sand and gravel aquifers are particularly vulnerable. Even thick sands over fractured bedrock represent a site vulnerable to contamination.

On the other hand, thick clay soils can slow, or even prevent, contaminants from reaching the water table. They may prevent or delay the day when a well "turns bad." If you have a deep well (more than several hundred feet below the surface), the groundwater supplying your well may have traveled a considerable distance underground, offering greater protection to the well.

3. Managing and maintaining existing wells

You wouldn't let a tractor run too long without an oil change. Your well deserves the same attention. Good maintenance means testing the water every year, keeping the well area clean and accessible, keeping pollutants as far away as possible, and periodically having a qualified well driller check the well mechanics.

Better management of your existing well

Existing wells were most likely located according to traditional practice or regulations in place at the time of construction. While these wells are still legal, you may want to consider how well yours conforms to current standards and recommendations, which incorporate new knowledge about groundwater contamination and well water. Current standards can be found in the state private well regulations (K.A.R. Article 30). Recommendations based on current research can be found within the *Farmstead Assessment System*, as well as other publications. Consult the contacts and references section.

You might want to move such activities as pesticide mixing, tank rinsing or gasoline storage further from your well. You might want to upgrade wells, get rid of well pits, install seals or extend casings. Some Kansas property transfer forms include language regarding underground petroleum storage tanks and well water safety.

Changing the location of other practices may prove expensive. (You can't move a livestock lot or a silo overnight.) Until you can meet minimum separation distances, change the way you manage such structures to control contaminants.

If your silo is too close to your well, for example, you may want to install a system for collecting any drainage from freshly ensiled forage. You could install a diversion ditch to direct livestock lot runoff away from the well.

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Short-term manure storage is another example. These areas pose a risk of well contamination by bacteria or nitrates. Locate storage areas on clay soil or, better yet, a concrete slab to reduce the chance of polluting your drinking water. Also, protect storage sites from rain and surface runoff.

Additional Farm•A•Syst fact sheets and worksheets provide more information on various potential contamination sources around your farmstead. Several management practices you may want to consider to help maintain the quality of your well water include:

- Do not use petroleum products, solvents, or lawn and agricultural chemicals near your well.
- Protect wells from wastes stored or disposed of around the farmstead.
- Protect wells from household wastewater treatment systems. Consider the possibility of upgrading or better management of your current system.
- Move traffic areas and chemical or fuel storage areas away from the well.
- **Limit the number of activities and structures located within 400 feet of your drinking-water well.**

Backflow prevention

Backflow or backsiphoning from pesticide mixing tanks allows chemicals to flow back into the well through the hose. Use an anti-backflow device when filling pesticide sprayer tanks to prevent the chemical mixture from flowing back into the well and contaminating groundwater. Inexpensive anti-backflow devices for hoses used to fill farm sprayers may be available from irrigation or spray equipment suppliers. Provide an air gap of at least six inches between the hose and the top of the sprayer tank being filled. As an additional safety factor, pesticides could be added after the tank has been filled.

Consider purchasing an inexpensive plastic nurse tank. A nurse tank is filled with water at the well and then used to fill the sprayer away from the farmstead—and away from the well. (For more information about preventing well contamination from pesticide mixing and loading practices, see Worksheet and Fact Sheet 2, *Pesticide Storage and Handling*.)

You should consider anti-backflow devices on all faucets with hose connections, and maintain air gaps between hoses or faucets and the water level during all activities. Otherwise, you risk having contaminated water from laundry tubs, sinks, washing machines, pressure washers, outside hydrants and swimming pools flow back through plumbing to contaminate your water supply. Water supplies that have cross-connections between them (connections between two otherwise separate pipe systems, such as potable and nonpotable) also put your drinking water at risk.

Water testing

Keep an eye on water quality in existing wells by testing them annually. Although you cannot have your water tested for every conceivable pollutant, some basic tests can indicate whether or not other problems exist.

At a minimum, test your water annually for bacteria and nitrate using a Kansas certified laboratory. Where the well draws from sandy materials or granite bedrock, testing once for corrosivity is also important. A good initial set of tests for a private well also includes hardness, alkalinity, pH, conductivity and chloride.

In addition, you may choose to obtain a broad scan of your water quality for a number of contaminants. Some labs offer a screening for metals, inorganic chemicals, volatile

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organic chemicals and herbicides/pesticides. These tests can be expensive, so you will probably not have them unless you suspect a specific problem.

When testing for additional contaminants, be sure to select contaminants that are most likely at your farmstead. Test for lead if you have lead pipes or soldered copper joints. Test for volatile organic chemicals (VOCs) if there has been a nearby use or spill of oil, petroleum or solvent.

While testing for pesticides can be very expensive (often $80-$100 per compound analyzed), the expense may be justified if:

- your well has nitrate levels over 10 mg/l (reported as nitrate-nitrogen, NO_3-N) or 45 mg/l (reported as nitrate, NO_3)
- a pesticide spill has occurred near the well, or backsiphonage has occurred
- your well is shallow or is located in sandy soil and downslope from irrigated croplands where pesticides are used

You can seek further advice on appropriate tests to run from your local health department, county Extension office, or KDHE district office.

You should test your water more frequently if:

- there are unexplained illnesses in the family
- there are pregnancies in the family
- there are noticeable changes in livestock or poultry performance
- your neighbors find a particular contaminant in their water
- you note a change in water taste, odor, color or clarity
- you have a spill or backsiphonage of chemicals or petroleum products near your well or on your farmstead
- you apply chemicals or manure to your fields within 100 feet of your well
- your livestock operation inspectors require it

You can have your water tested by a commercial laboratory. A list of Kansas certified labs is available from your county Extension office or health department, or contact KDHE laboratory services (see contacts and references). Follow the lab's instructions for water sampling to assure accuracy of the results. Use only the container provided, and return samples promptly. Bacteria sample bottles are sterile and must be returned to the lab within specified time limits.

Because many materials, including bacteria and nitrate-nitrogen, naturally occur in minor amounts in groundwater and the levels can vary seasonally, you may want to contact a specialist for help in interpreting test results. Contact the KDHE district office for your area for assistance. Several Extension and KDHE bulletins may be of help as well (see contacts and references).

Keep in mind that activities off your farm can affect your groundwater. Chemical spills, changes in land use and the presence of landfills can increase the chance of pollutants getting into your water. Bacteria and nitrates are two important indicators which may suggest problems with the well's location or construction, and at excessive levels, they can cause health problems. If your water has a high nitrate or bacteria level, you may want to talk with a specialist about the need for additional testing.

It is also important to record test results and to note changes in water quality over time. In addition to water analysis test results, you should keep records of a few other things to tell what is happening with your water system. These include well construction details, and dates and results of maintenance intervals for the well and pump.

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Well maintenance

Well equipment doesn't last forever. Every 10 to 20 years, your well may require mechanical attention from a Kansas licensed well driller or qualified pump installer. Well maintenance also includes protecting your well from contamination sources.

4. New wells

New wells are expensive—but they are a good investment for the future. Getting the most from such an investment means locating the well away from contamination sources and working to maintain the quality of the well. Some simple principles are:

- Follow the required minimum separation distance of 50 feet from potential contamination sources (100 feet for livestock sources), as well as any local ordinances, when locating your new well. Kansas Administrative Regulations Article 30 contains requirements for drinking water wells. A full listing of requirements is also available from either your county health department or Extension office, a Kansas licensed well driller or KDHE.
- Locate your well on ground higher than such surrounding pollution sources as fuel tanks, livestock lots, septic systems or pesticide mixing areas. Where practical, locate the well as far as possible from pollution sources. There is no specific distance from a potential pollution source that will guarantee the well will not be affected. Recent studies, however, indicate that 200 to 400 feet is required for a high level of assurance that the well will be protected.
- Build soil up around the well so that all surface water drains away from it, maintaining the minimum 12 inches of casing above the soil surface.
- Avoid areas that are prone to flooding.
- Groundwater flow generally follows surface drainage patterns. Unless you know the exact direction of groundwater flow on your property, locate the well so that pollution sources are between the well and the nearest creek, river or lake. Groundwater generally flows from upland areas and discharges in a surface water body. In all cases, locate your well on ground higher than surrounding pollution sources such as fuel tanks, livestock lots or pesticide mixing areas.
- Make the well accessible for pump repair, cleaning, testing and inspection.
- Hire a competent, Kansas licensed well driller. Make sure the driller disinfects the well with chlorine after construction, tests the water for bacteria after drilling, and provides you with a copy of the water well record (form WWC-5) which includes detailed information about the well's depth and construction.

5. Abandoned wells

Many farms have abandoned wells. It is not uncommon to visit a farmstead and find three or four wells with only one or two currently in use. Old home sites or shallow wells once pumped by windmills are common. No one knows how many of these wells there are in Kansas, although estimates range in the hundreds of thousands.

If not properly filled and sealed, these wells can provide a direct conduit for surface water carrying pollutants to enter groundwater without filtering through soil, or allow contaminant movement from one aquifer to another. Several improperly plugged wells in Kansas have caused severe contamination of drinking water from wells on the same property. The abandoned wells provided direct access for the entrance of contaminants into the groundwater.

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In addition to these wells being a threat to groundwater, large open wells pose safety hazards for small children and animals. Kansas law makes the landowner responsible for plugging wells and test holes and therefore liable for any occurrence of contamination or injury.

You may perform well abandonment work on your own land. A license is not needed, but you must meet the minimum requirements in Kansas regulations when you abandon and plug a well. A Kansas licensed well driller can also be hired to close these wells. A local well driller will have experience with well construction materials and methods as well as a working knowledge of the geology of the well site.

Special equipment is often required to remove old pumps and piping and to properly install plug material inside the well. Use of inappropriate materials and methods can lead to well settling, collapse and continued groundwater contamination. If plugging materials are improperly installed in a well, patching up defective work is nearly impossible.

Locating abandoned wells

Pipes sticking out of the ground around the farmstead, in an area where a farmstead used to be, or under an old windmill are the most obvious places for finding abandoned wells. You may not know the history of your property, however, and abandoned well locations may not be obvious. A depression in the ground may indicate an old well. Also, wells were often drilled in basements of houses, or under front steps, or near old cisterns.

Plugging abandoned wells

The Kansas Department of Health and Environment administers the laws regulating construction, reconstruction and plugging of wells. Article 30 of the Kansas Administrative Regulations (K.A.R. 28-30-4(a) and 28-30-7) specifically addresses the plugging of abandoned wells. The regulations provide instructions for all types of wells and aquifer conditions. Well drillers and landowners are required to follow these procedures.

- Remove pump, piping and any other obstructions from the well and clear the area around the well.
- The well must be chlorinated before it is sealed. The entire length of the well should then be sealed to prevent surface water from entering the groundwater, and to prevent contamination movement from one aquifer to another.
- As part of the plugging procedure, a water well record (form WWC-5) must be filed with KDHE. WWC-5 forms can be obtained by calling KDHE at (913) 296-5524 and are frequently available locally through county health departments or Extension offices.
- The goal of proper sealing is to restore as closely as possible the geologic conditions that existed before the well was constructed. For specific requirements, consult Extension bulletin, MF-935, *Plugging Abandoned Wells*, or the KDHE *Well Plugging Packet* (see Contacts and References).

Proper well closing takes time and money. Costs will vary with the well depth, diameter and geology of the area. However, spending a few hundred dollars plugging an abandoned well near your home may prevent contamination of your drinking water. Contact your local health department, county Extension office, or KDHE for additional information.

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CONTACTS AND REFERENCES

Who to call about...

Certified water testing laboratories

A listing is available from your county health department or Extension office, or contact KDHE laboratory services, (913) 296-1500.

Interpreting well water test results

Your county health department or Extension office, or the KDHE office for your area:

Southwest District (Dodge City): (316) 225-0596
South Central District (Wichita): (316) 838-1071
Southeast District (Chanute): (316) 431-2390
Northeast District (Lawrence): (913) 842-4600
North Central District (Salina): (913) 827-9639
Northwest District (Hays): (913) 625-5664

Drinking water quality standards and other drinking water concerns

U.S. Environmental Protection Agency's Safe Drinking Water Hotline. Call toll free 1(800) 426-4791 from 7:30 a.m. to 4 p.m. Central Standard Time.

Kansas Department of Health and Environment, Bureau of Water, (913) 296-3565.

Conditioning and treatment devices

Your county health department or Extension office, KDHE district office, or the National Sanitation Foundation, 3475 Plymouth Road, P.O. Box 1468, Ann Arbor, Michigan 48106, (313) 769-8010.

Before installing treatment devices on water supplies contaminated with nitrates, heavy metals, VOCs, pesticides, microorganisms and other health-related contaminants, contact the KDHE Bureau of Water, Forbes Field, Topeka, Kansas 66620, (913) 296-3565.

Locating possible sources of contamination

Your local health department or county Extension office, a Kansas licensed well driller, or the Groundwater Management District or KDHE district office for your area. Besides locating contamination sources, they can also recommend improvements to decrease contamination potential.

Well construction or inspection, and plugging of abandoned wells

Your county health department or Extension office, a licensed well driller, or the KDHE district office for your area.

A copy of your well construction record (WWC-5)

If a report was filed with the state, contact either KDHE, Forbes Field, Building 740, Topeka, Kansas 66620, (913) 296-3565, or the Kansas Geological Survey, Well Log

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Library, 305 Moore Hall, Lawrence, Kansas 66045, (913) 864-3965. Be prepared to provide the legal description (county, township, range, section and quarter section) of the well's location. (If your farm covers more than one section, make a note of that in case well drillers reported the wrong section.) If known, provide the year the well was installed and the owner's name at the time.

What to read about...

Publications are available from sources listed at the end of the reference section. (Refer to number in parentheses after each publication.)

Groundwater contamination and protection

Safe Domestic Wells. MF-970. (1)
Groundwater and Well Contamination. MF-932. (1)
Managing the Farmstead to Minimize Groundwater and Well Contamination. MF-948. (1)
Nitrates and Groundwater. MF-857. (1)
Pesticides in Drinking Water. MF-961. (1)
Ensuring Safe Drinking Water. MF-952. (1)
Private Water Systems Handbook. 1979. Fourth edition. MWPS-14. (2)
Includes information on wells and other water supply systems; pumps, piping and water treatment. (Recommendations may not meet Kansas codes.)
Selecting a Site and Constructing a Well. 1990. ACRE Fact Sheet #7. (3)
Kansas Well Regulations. KDHE. (4)
A Manual of Recommended Standards for Locating, Constructing, and Equipping Water Wells for Rural Homes. KDHE Bulletin #4-1.(4)

Water testing, interpretation and treatment

Suggested Water Tests for Private Systems. MF-871. (1)
Taking a Water Sample. MF-963. (1)
Testing to Help Ensure Safety of Drinking Water. MF-951. (1)
Commercial Laboratories Certified for Water Quality Tests. MF-872. (1)
Understanding Your Water Test Report. MF-912. (1)
Ensuring Safe Drinking Water. MF-952. (1)
Explanation of Your Drinking Water Analysis. KDHE. (4)
Testing Well Water for Contamination. 1990. ACRE Fact Sheet #19. (3)
Questions to Ask Before Buying Water Treatment Equipment. MF-923. (1)
Shock Chlorination for Disinfecting Water Systems. MF-911. (1)
Disinfection of Private Water Supplies. MF-886. (1)
Activated Carbon Filters. MF-883. (1)
Choosing Bottled Water. MF-1037. (1)
Hard Water: To Soften or Not to Soften. MF-848. (1)
Microfiltration. MF-882. (1)
Reverse Osmosis. MF-884. (1)

Abandoned Wells

Plugging Abandoned Wells. MF-935. (1)
The Importance of Sealing an Abandoned Well. 1990. ACRE Fact Sheet #6. (3)
KDHE Well Plugging Packet. KDHE. (4)

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Publications available from...

1. Your county Extension office or directly from Extension Distribution Center, Umberger Hall, Kansas State University, Manhattan, Kansas 66506, (913)532-5830. There may be charges for publications, postage and sales tax.

2. Your county Extension office or the Midwest Plan Service Secretary, Extension Agricultural Engineering, 237 Seaton Hall, Kansas State Univer sity, Manhattan, Kansas 66506, (913) 532-5813. There may be charges for publications, postage and sales tax.

3. Alliance for a Clean Rural Environment (ACRE), P.O. Box 413708, Kansas City, Missouri 64141, 1(800) 545-5410.

4. Kansas Department of Health and Environment, Forbes Field, Building 740, Topeka, Kansas 66620, (913) 296-3565, or the KDHE district office for your area.

FARM•A•SYST
Farmstead Assessment System

The Farmstead Assessment System is a cooperative project of the Cooperative Extension Service, Kansas State University, and the Kansas Department of Health and Environment.

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