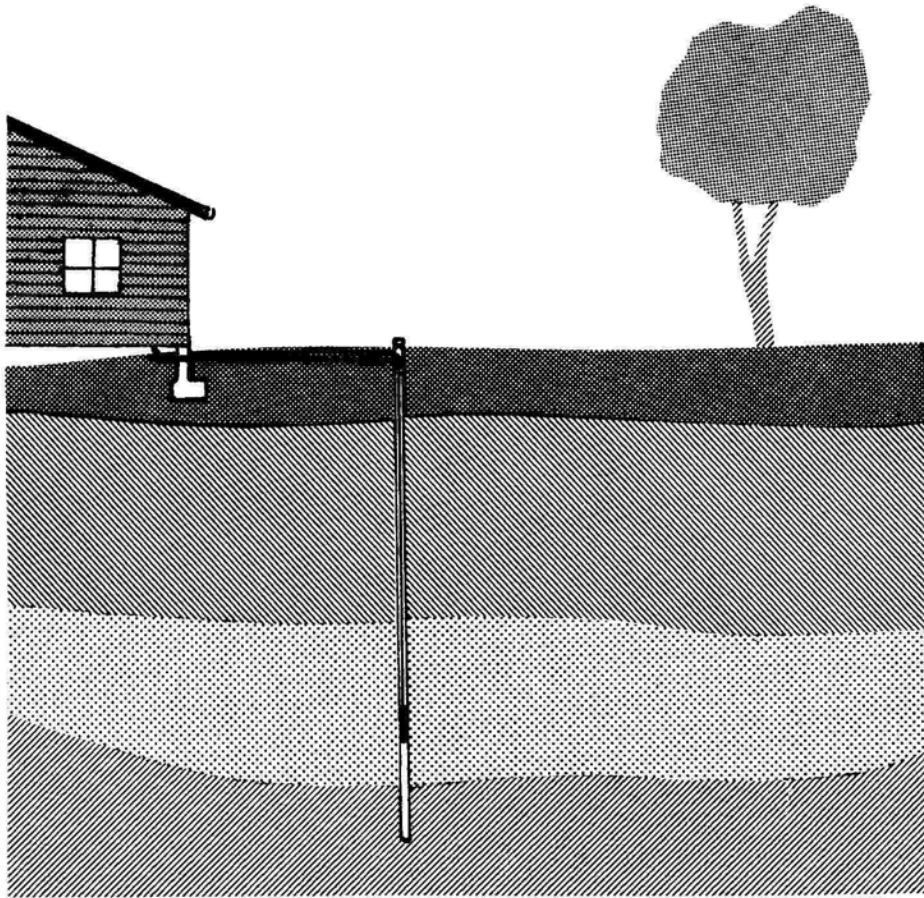


A HANDBOOK FOR THE KENTUCKY WATER WELL USER



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July 1986

FOREWORD

This handbook will answer some of the most frequently asked questions concerning groundwater, the drilling of water wells, water sampling and well disinfection. It was prepared to help well owners understand the importance of maintaining and protecting their wells, instruct them on how to disinfect and sample their wells for bacteriological contamination, and indicate where to obtain further information and help with groundwater-related problems.

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GROUNDWATER--a plentiful resource

Groundwater is one of Kentucky's most plentiful and important natural resources. More than ninety-eight percent of the fresh water available to humans is groundwater. This far exceeds the available volume of surface water. Groundwater, like surface water, is part of the **hydrologic cycle** (Figure 1). This cycle begins with rainfall upon the land. Water runs off into streams and rivers or filters through soil and rock layers to be stored in underground "reservoirs" called aquifers. Water in the aquifer can be reached by drilling a well that penetrates this saturated zone. Groundwater may also be obtained at springs where it enters streams or rivers. Groundwater normally offers a clean, naturally filtered source of water at a constant temperature. However, man's activities can create serious problems with groundwater quality and quantity.

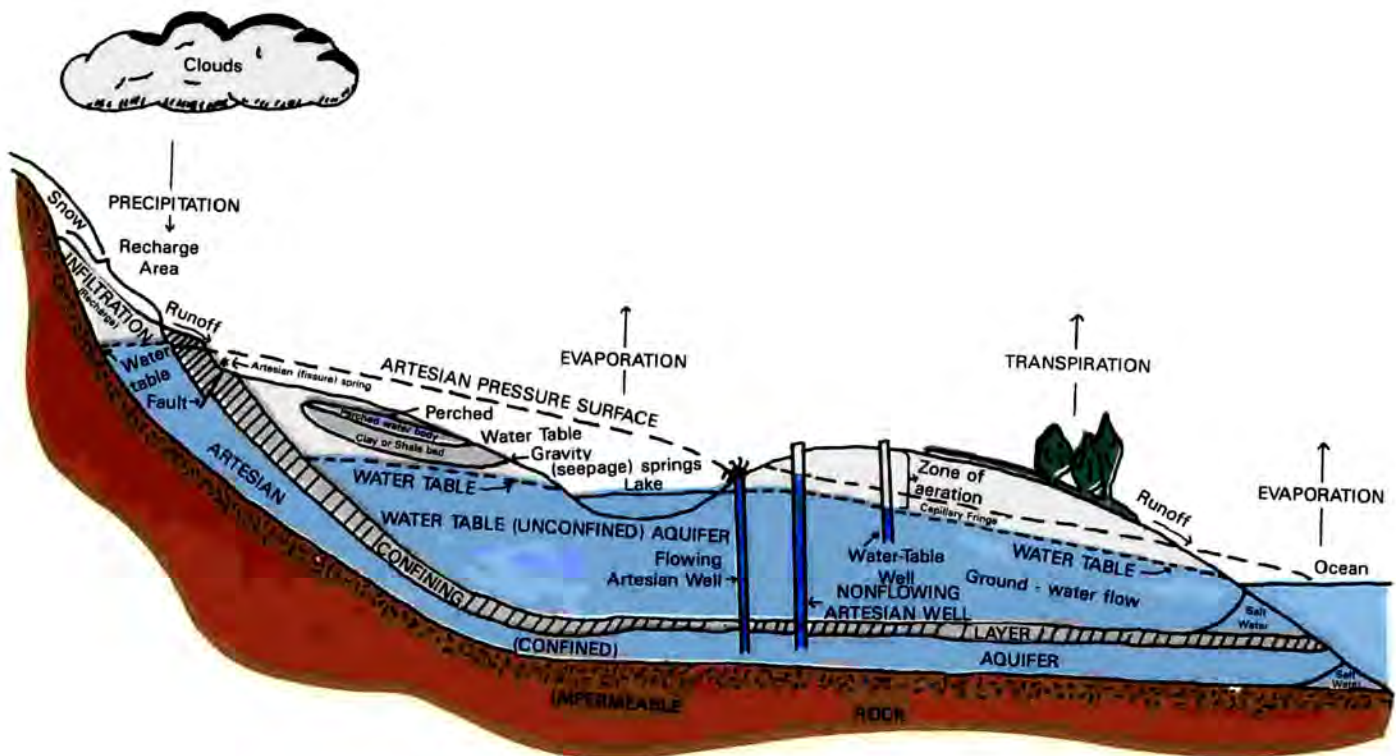


Figure 1 The hydrologic cycle.

GROUNDWATER-- a need for protection

It is vitally important for the good health of groundwater users that their wells or springs are protected from sources of contamination. These sources may include feedlots, septic tanks, abandoned wells, sewer lines, and cesspools, and can cause severe problems in drinking water. Proper well siting, construction, and maintenance are essential to the safekeeping of your groundwater supply.

WATER WELLS--new construction standards for the protection of health

Regulations adopted to implement the Water Well Drillers Law, KRS 223.400-223.460 and 223.991 require that water well drillers be certified by the Commonwealth of Kentucky. These regulations set construction standards and practices and cover any well constructed, repaired or altered for the extraction of water. For more information on the Water Well Drillers Program, contact the Division of Water, 18 Reilly Road, Frankfort, KY 40601.

BEFORE I DRILL...

How do I find a reliable driller?

The names of certified drilling contractors may be obtained from the Division of Water, your county extension agent, local health department, well pump suppliers, the telephone directory, or neighbors who own wells. Even though water well drillers are certified by the state, homeowners should check the driller's reputation and reliability for their particular needs.

Water well drillers must be certified by the state and meet minimum standards in order to drill water wells in Kentucky. These standards include having liability insurance, a bond, and a minimum of two years experience. They are issued a certification card by the Division of Water and are required to display their certificate number on their drilling rig.

How much water will I need to supply my household?

The average household uses approximately fifty gallons of water a day per person. For more specific information on water needs, contact your local public health or sanitation officials, a municipal engineer, or well drilling contractor.

When determining your water needs, consider all present and potential water use such as: a dishwasher, a washing machine, the number of bathrooms, a swimming pool, lawn or garden irrigation, fire protection, and food preparation.

In areas where groundwater availability may be limited (low yield areas), contact a certified water well driller about methods for ensuring an adequate supply of water to meet your daily needs.

Where should my well be located?

Your well should be located at a higher elevation than any septic tank, livestock feedlot, or other potential contamination sources on your property or neighboring property. Your contractor should be familiar with the standards for well locations.

The minimum distances a well may be located from the following sources of contamination are found in 401 KAR 6:310:

These are:

Cesspools	150 feet
Pit privy	75 feet
Lateral fields	70 feet
Manure piles	75 feet
Septic tank	50 feet
Barnyard	50 feet
Sewers (depending on type)	15 - 50 feet
Footing drains	10 feet
Pump house floor drain	2 feet

How deep will the well have to be?

It is almost impossible to determine in advance how deep you will have to drill to find a sufficient water supply. Neighboring wells may offer some indication and the contractor can give a reasonable estimate. The Kentucky Geological Survey, the U.S. Geological Survey, or a hydrogeologist may be able to provide an estimate.

How much casing should be used in my well?

Kentucky regulations require that a minimum of twenty feet of casing be used in consolidated rock. In sand and gravel areas, wells must be cased along their entire length. Under no circumstances should less than twenty feet of casing be used in any well. The regulations specify the types of casing that must be installed. Local geologic conditions may require much more casing than the required minimum specified in the regulations. Some wells require hundreds of feet of casing. Properly installed and sealed casing is the best protection against contaminated water entering your well from the surface or from less desirable aquifers. Drillers are required by law to case off all bad water zones to prevent mixing within the well and the subsequent degradation of good water zones.

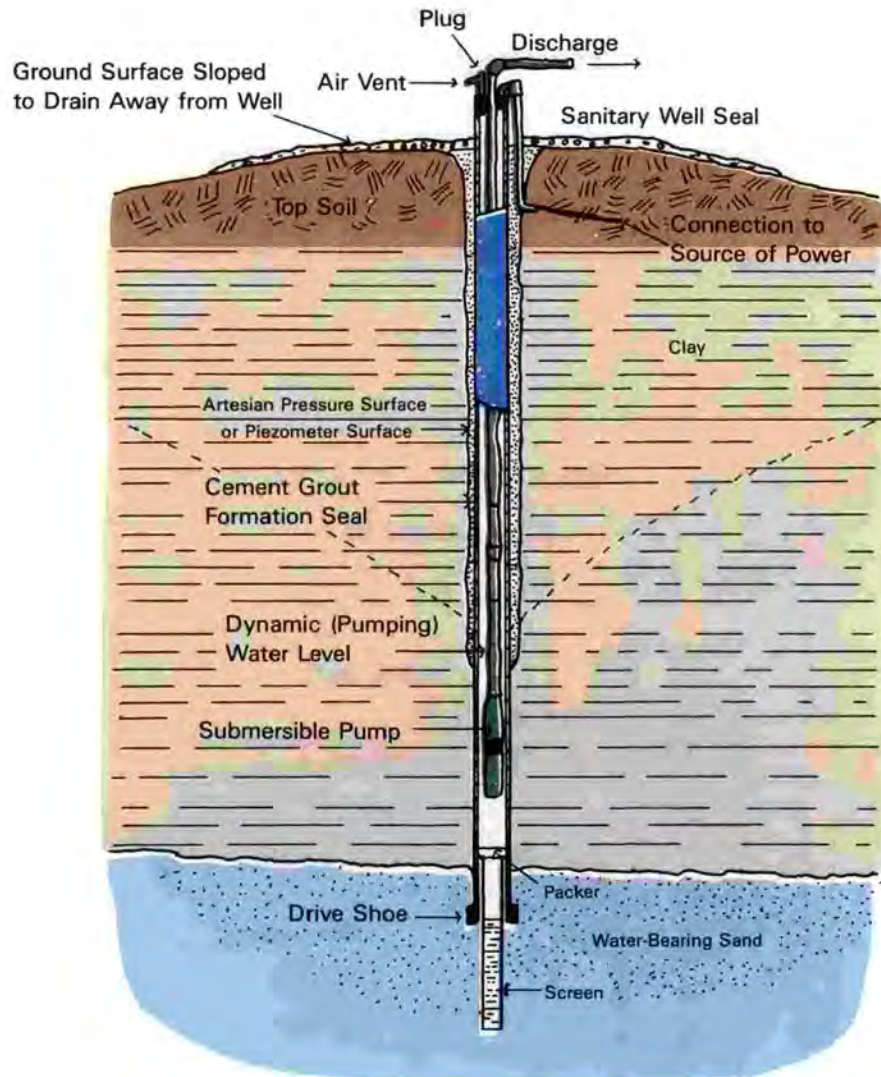


Figure 2 Drilled well with submersible pump.

Should the well casing be visible above the ground?

Yes. Cutting off the casing below ground surface leaves the well vulnerable to many sources of contamination. **Buried casing** is probably the **leading cause** of well contamination in the state. Kentucky law requires that at least four inches of casing extend above the ground.

Access to the well casing is important:

1. for the inspection and maintenance of the pump and well casing,
2. to measure the water and well depth,

3. to disinfect the well,
4. to allow a water sample to be taken from the well if needed, and
5. to prevent surface water from entering the well.

The use of modern pitless adapters has eliminated the need to bury well casings or construct wells in frost or well pits. By following these important points, groundwater quality throughout the state will be greatly improved.

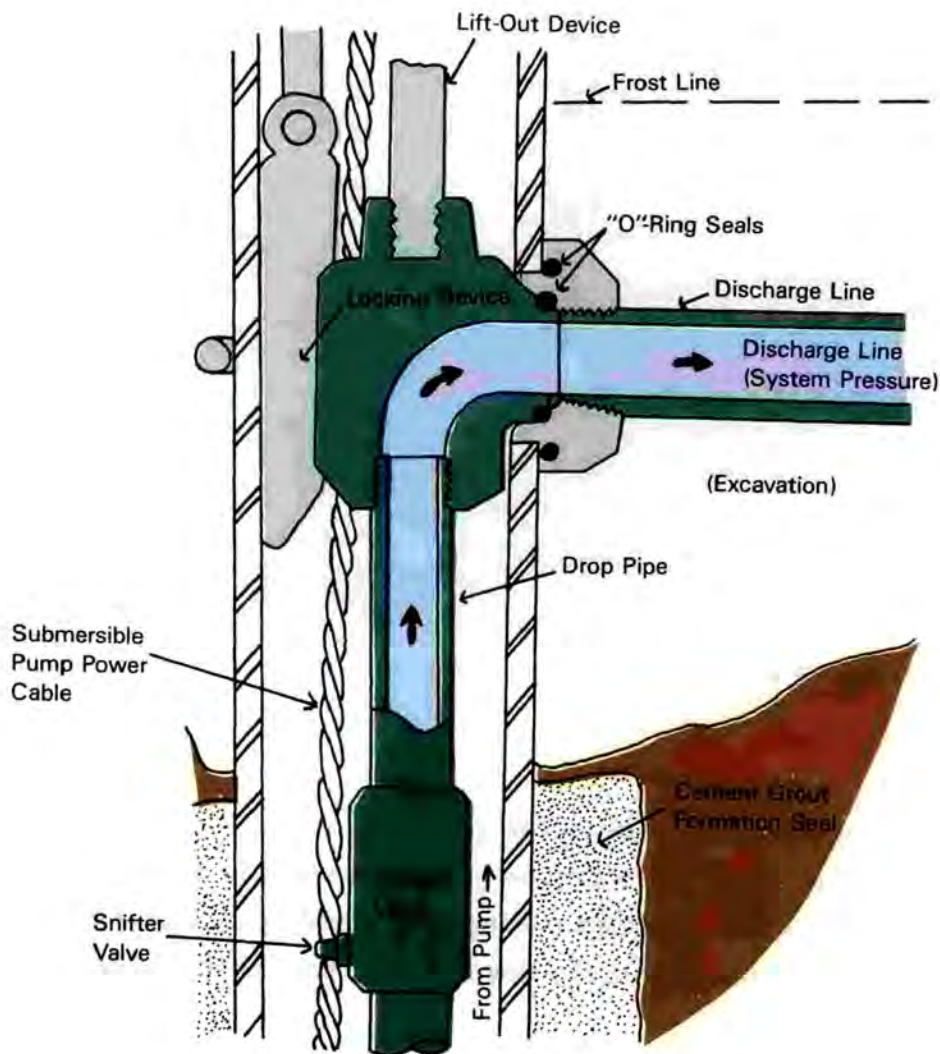


Figure 3 Clamp-on pitless adapter for submersible pump installation.

How can I be sure that my well won't be contaminated?

There are no guarantees that a particular well will not suffer problems at some point in the future, but proper location, casing, capping, and sealing of the well will go a long way toward preventing contamination. Disinfecting your well once a year will also help. If a change in your water quality or quantity occurs, contact your well driller and ask him to inspect your well and water supply system. If you live in an area where seasonal flooding is common, it is a good idea to have your well tested for bacteria immediately after the flood.

Surface activities also affect groundwater. Pesticides, degreasers, or other toxic chemicals may find their way into your well because of improper handling and disposal. This problem is even more severe in limestone areas where sinkholes (groundwater recharge areas) are commonly used as dump sites. You and your neighbors may want to survey the surrounding area to determine whether there are any practices occurring which could affect your well water. **It is much easier to prevent groundwater contamination than to clean it up.**

How much will my well cost?

Wells in the same locality, tapping the same aquifer, usually don't vary much in cost. To get a good idea of drilling and completion costs in your area, consult a certified water well driller. The well driller can estimate drilling cost (per foot), casing (per foot), cost of additional materials (drive shoes, screens, seals, etc.), cementing, development, pumping equipment, well tests, and treatment (for water and the well). Remember, well drillers, like any other business, are entitled to a reasonable profit margin. An unreasonably low bid for a well will not be such a good deal if it means that the well will not be drilled or completed correctly.

The 1986 legislature passed a law which enables the Kentucky Housing Corporation to develop a financial assistance program for the replacement or rehabilitation of unsafe wells for low income families. For more information contact:

Kentucky Housing Corporation
1231 Louisville Road
Frankfort, KY 40601
(502) 564-7630

or

108 Kentucky Towers
Louisville, KY 40202
(502) 588-4776

If I have a complaint about a driller, who should I contact?

If you feel your well has been improperly drilled or serviced , please contact the Division of Water, Groundwater Section.

What should be done with an abandoned water well?

Abandoned water wells allow contaminated surface water and groundwater to mix and contaminate good aquifers. The pollution spreads throughout the aquifer and causes the contamination and abandonment of good wells nearby. It is important that all water wells be properly maintained or removed from service and plugged. Specific plugging information can be obtained from a certified water well driller or the Division of Water.

May I get a record for my new well?

Yes, a driller's log must be filled out for all wells drilled or modified since August, 1985. The driller is required by law to provide a copy of the log to the well owner and the Division of Water. The well log is an important document and contains information needed to use your well in the future. It contains the date the well was drilled, who drilled it, depth of well, depth to water, amount and type of casing used, lithologic log, pump type, and water quality data. If your well was drilled after August 13, 1985, and you have not received a well record from the driller, please contact the Groundwater Section, Division of Water.

AFTER MY WELL IS COMPLETED...

What are the most common contaminants I could expect to find in my well?

In Kentucky, the most common contaminants are coliform bacteria, hydrogen sulfide, iron, and manganese. The presence of coliform bacteria could be the result of improper location of the well or failure and/or improper installation of the well casing. An improperly sealed and cased well can cause contamination of an aquifer and foul surrounding wells. High coliform levels could be caused by a septic tank, feed lot, barn or other human or animal waste source.

Hydrogen sulfide, iron, and manganese are naturally occurring elements in the earth's crust and are sometimes released by overpumping the well or by the buildup of harmless bacteria in the well. Mining or oil and gas activities may be a source of contaminants. The presence of hydrocarbons (oil and gasoline) are not uncommon in areas where fuel tanks have been abandoned or allowed to leak. Incidents of groundwater contamination should be reported directly to the Division of Water.

How do I find out if my well is contaminated?

The only way to find out is to sample the water in the well. The drilling contractor is required to sample a new well upon completion and have the water analyzed for coliform bacteria. To have water sampled in existing water wells, contact your local health department or a private laboratory. The local health department will sample and analyze your water for bacteriological contamination and provide technical assistance to you.

Where do I find a laboratory to analyze my water?

Laboratories certified to analyze drinking water samples for bacteria are listed in the back of this handbook. Many of these laboratories also test for other contaminants. If you have questions concerning the use of a laboratory, contact the Division of Water or your local health department.

If I notice unusual tastes, odors, or colors in my well water, what should I do?

If your well water becomes undrinkable or begins to stain clothing or dishes, contact your local health department, the Division of Water, or a certified water well driller.

Can I treat the water after it is pumped out of the well?

Most groundwater requires little or no treatment before use. However, new technology allows the effective treatment of groundwater previously considered undrinkable. Public surface water supplies have required treatment for many years and groundwater treatment is becoming more common.

Available treatment methods depend upon the contaminants present in the water. Making inquiries among neighbors and water well contractors about local water quality before you drill may yield information on what treatment methods (if any) are common in the area.

The treatment methods most often employed for bacterial contamination include chlorination, filtration, ultraviolet radiation, and ozonization. Chlorinators can be added to a house plumbing system but must be properly maintained and have sufficient contact time with the water. Filtration is an effective means of removing small particles from well water, but is ineffective against most biological contaminants. Ultraviolet irradiation kills bacteria in the same way sunlight treats surface water. This treatment method consists of one or more lamps that allow water to pass around them. Most ultraviolet systems are very efficient and require little maintenance. Ozonization has a greater germicidal effect on bacteria and viruses than chlorination, but costs much more than other treatment systems. It does not add chemicals to the water, but purifies with a form of oxygen.

Chemical contaminants must be dealt with by more complex means. Depending upon the type of chemical involved, the treatment method may be as simple as a water softener or as complicated as a reverse osmosis system.

Your driller, local health department, or well supply company will have more specific information on water treatment.

How do I sample my well?

Instructions for sampling a well are contained in the “How to Sample Your Water Well” section of this booklet, or assistance may be obtained from your local health department’s environmental personnel for sampling wells, springs or cisterns.

How often should I sample my well?

Generally, domestic drinking water wells should be sampled and analyzed at least once a year for biological contaminants (such as coliform bacteria) and once every two or three years for chemical contaminants (such as iron and manganese). If there are known problems in your area with specific contaminants or you have experienced previous problems with a particular well (due to flooding, land disturbances, waste disposal sites), you might wish to sample for those specific contaminants more frequently. For persons on low sodium diets, sodium should be tested for, especially if a water softener is used.

Can I disinfect my own well?

Of course you can. Instructions for disinfection can be found in the “How to Disinfect Your Water Well” section of this booklet. For assistance, call your local health department (especially for springs or cisterns) or a certified water well driller.

HOW DO I DISINFECT MY WATER WELL

When your well is completed, state regulations require the disinfection of your well by the drilling contractor. After that, it is up to you to keep your well sanitary by disinfecting it at least once a year or any time work is performed on the well. Some drilling contractors have standard maintenance agreements for well inspection and disinfection. The following method is recommended for disinfecting a well. Carefully read the instructions before attempting the procedure.

Figure 4 - Water Well Disinfection Chart

— Quantities^a of calcium hypochlorite, 70 percent (rows A) and liquid household bleach, 5.25 percent (rows B) required for water well disinfection

Depth of water in well (ft.)	Well diameter (in.)																
	2	3	4	5	6	8	10	12	16	20	24	28	32	36	42	48	
5	A	1T	1T	1T	1T	1T	1T	2T	3T	5T	6T	3 oz.	4 oz.	5 oz.	7 oz.	9 oz.	12 oz.
	B	1C	1C	1C	1C	1C	1C	1C	1C	2C	4C	1Q	2Q	3Q	3Q	4Q	5Q
10	A	1T	1T	1T	1T	1T	2T	3T	5T	8T	4 oz.	6 oz.	8 oz.	10 oz.	13 oz.	1½ lb.	1½ lb.
	B	1C	1C	1C	1C	1C	1C	2C	2C	1Q	2Q	3Q	4Q	4Q	6Q	8Q	2½G
15	A	1T	1T	1T	1T	2T	3T	5T	8T	4 oz.	6 oz.	9 oz.	12 oz.	1 lb.	1½ lb.	1½ lb.	2 lb.
	B	1C	1C	1C	1C	1C	2C	3C	4C	2Q	2½Q	4Q	5Q	6Q	2G	3G	4G
20	A	1T	1T	1T	2T	3T	4T	6T	3 oz.	5 oz.	8 oz.						
	B	1C	1C	1C	1C	1C	2C	4C	1Q	2½Q	3½Q						
30	A	1T	1T	2T	3T	4T	6T	3 oz.	4 oz.	8 oz.	12 oz.						
	B	1C	1C	1C	1C	2C	4C	1½Q	2Q	4Q	5Q						
40	A	1T	1T	2T	4T	6T	8T	4 oz.	6 oz.	10 oz.	1 lb.						
	B	1C	1C	1C	2C	2C	1Q	2Q	2½Q	4½Q	7Q						
60	A	1T	2T	3T	5T	8T	4 oz.	6 oz.	9 oz.								
	B	1C	1C	2C	3C	4C	2Q	3Q	4Q								
80	A	1T	3T	4T	7T	9T	5 oz.	8 oz.	12 oz.								
	B	1C	1C	2C	4C	1Q	2Q	3½Q	5Q								
100	A	2T	3T	5T	8T	4 oz.	7 oz.	10 oz.	1 lb.								
	B	1C	2C	3C	1Q	1½Q	2½Q	4Q	6Q								
150	A	3T	5T	8T	4 oz.	6 oz.	10 oz.	1 lb.	1½ lb.								
	B	2C	2C	4C	2Q	2½Q	4Q	6Q	2½G								

^aQuantities are indicated as: T = tablespoons; oz. = ounces (by weight); C = cups; lb. = pounds; Q = quarts; G = gallons.

1. Determine the well diameter in inches and the depth of water in the well. The latter figure may be obtained from your driller or from your well log form. Using Figure 4, find the well diameter on the scale reading from left to right and the depth of water in feet reading from top to bottom. The figures given in the box where both columns meet are the amount of calcium hypochlorite, 70 percent (Rows A) and liquid household bleach, 5.25 percent (Rows B) needed for disinfection.
2. If liquid household bleach is used, for cases in the green shaded area, mix the bleach needed in five (5) gallons of water. For cases in the blue shaded area, mix the bleach needed in ten (10) gallons of water.
3. Remove the well cap or seal . Pour the prepared solution into the well. Be sure to splash some of the solution around the casing or wall of the well. If dry granules or tablets are used, add them directly to the well.
4. Connect one or more hoses from faucets on the discharge side of the pressure tank. Run the hoses to the well casing and recirculate the water into the well for at least fifteen (15) minutes. Be sure to splash the chlorinated water around the well casing, particularly if dry granules or tablets were used. The draining of the pressure tank should cause the well pump to turn on. Open each faucet on the system and let the water run until you smell chlorine. Close all faucets, then recap or reseal the well. This will allow chlorinated water to enter and disinfect the plumbing system.
5. Let the solution stand in the well for several hours, preferably overnight.
6. After allowing the water to stand, turn on your pump and let water run from all faucets until the chlorine odor disappears. Faucets on fixtures discharging to septic tank systems should be throttled to a low flow to avoid overloading the system.

No harm is done to your well if you use too much chlorine solution or too strong a solution. It is better to use too much than not enough. **(CAUTION: Be sure to flush the chlorine from the pipe system and well before using it.)** The solution should be prepared in a thoroughly cleaned glass, crockery, or rubber-lined container. Do not use a metal container because strong chlorine solutions corrode metals. Prepare only the amount of solution required to meet your immediate needs because it loses strength rapidly.

Calcium hypochlorite is the most popular source of chlorine used in the disinfection of wells and is sold at chemical supply and some hardware stores. It should be stored in a cool, dry place.

Sodium hypochlorite may be used instead of calcium hypochlorite. This chemical is available only in liquid form and is commonly known as household laundry bleach.

KEEP THESE AND ALL CHEMICALS OUT OF THE REACH OF CHILDREN.

HOW DO I SAMPLE MY WATER WELL *

The following procedures should be followed by the sampler. Carefully read through the procedures before sampling:

1. Obtain a clean, sterile sample container from the lab. Do not open the container until you are ready to sample the water.
2. Remove the aerator and any other attachments on the cold water tap nearest the pressure tank or well. Do not use a tap with a swivel faucet. Usually, the bathroom sink faucet offers the best sampling point.
3. Turn on the tap. Let it run until the pump kicks on and for at least five (5) minutes after that. This is to insure that the sample represents the groundwater source and not water retained in the holding tank or pipes. A smooth-flowing water stream at moderate pressure should be obtained.
4. Wash your hands thoroughly. Hold the container in one hand and the cap, threads down, in the other. Do not put the cap on the ground, on the counter, or in your pocket. Do not touch the inside of the container or the cap. Do not touch the water stream.
5. Do not rinse the container. Carefully fill the container, avoiding contact between the neck of the container and the faucet. Leave one inch of airspace at the top. Replace the cap tightly.
6. Time your sampling procedure so that you are able to transport the sample to the lab as soon as possible. If you are not able to transport the sample almost immediately, place it in the refrigerator until you are able to take it to the lab. Under **no** circumstances should you keep a sample more than 24 hours before getting it to the lab. Samples should be kept on ice during transport.

***NOTE:** The above procedures apply to sampling for coliform bacteria only. Sample collection for other contaminants may require special containers and sampling procedures. Always contact the laboratory or local health department for assistance when sampling for other contaminants to ensure a testable sample.

INTERPRETING MY LABORATORY RESULTS *

Your laboratory should test the sample for fecal coliform or total coliform and analyze it according to the Membrane Filter (*MF*) or Most Probable Number (*MPN*) methods as described in Standard Methods for the Examination of Water and Wastewater. Your laboratory will be familiar with the methods and this publication. The number of bacteria in a well can vary between zero and thousands of colonies, so you should request dilutions of your sample of 100, 10, and 1 milliliter (ml) if the *MF* method is used.

The results you receive from the laboratory will indicate whether or not your well is contaminated by biological matter. The numbers and figures used in your results should look something like this:

1 total coliform colony/100 ml

This tells you that after the sample was diluted and incubated for the proper amount of time, only one colony of coliform bacteria showed up on the sample medium.

According to Standard Methods, if your sample shows more than four colonies of total coliform per 100 ml, you should consider your well contaminated.

If your well is contaminated, don't panic. Disinfect the well according to instructions in this handbook. Wait twelve to twenty-four hours, allowing the well to recover, then resample. If the contamination has not reappeared, you've probably solved the problem. If the disinfection didn't take care of the contamination, you should call a certified well driller, the local health department, or the Division of Water. In the meantime, boil all the water you intend to drink or cook with for five to ten minutes before use.

***NOTE:** For interpretation of test results for other contaminants, and methods of treatment, contact the Division of Water or your local health department..

DOMESTIC WATER WELL OWNERS GROUNDWATER PROTECTION PLAN

You can help protect your water supply from pollution by following these simple procedures. If you have questions concerning your water quality or this protection plan, contact the Division of Water or your local health department.

1. Have your well tested every year for total or fecal coliform bacteria. Coliform bacteria are organisms found in the gut cavity of warm blooded animals, including man, whose presence in water is an indicator of potentially dangerous bacterial contamination. Disinfect the well if necessary.

2. Contour the area around your well so that surface water drains away from the well. According to statute, a minimum of four (4) inches of well casing must extend above the ground surface .

3. Inspect the exposed well casing and cap regularly for cracks and corrosion. A crack or hole in the casing or cap may allow contaminants to enter the well and pollute the well water.

4. Do not mix, store or use pesticides, fertilizers, herbicides, cleaning solutions, fuels or solvents in your pump house or around your well. A leak or spill could allow these materials to enter your well. All fertilizers, pesticides and herbicides should be applied according to the manufacturer's instructions. Excessive applications increase the potential for percolation of these chemicals through the soil into the groundwater. Devices to prevent back-siphoning should be installed on all faucets and hoses used to fill pesticide and herbicide sprayers. Unused pesticides and herbicides and their containers should be disposed of properly so humans, animals and water are not endangered.

5. Do not dump waste oil, solvents, paints, or other toxic or hazardous substances onto the ground or into a drain connected to your septic tank. These substances pass through your septic system and percolate through the soil and contaminate groundwater. The earth's surface filters water and other materials as they percolate downward to the water table, much like the oil filter on your car. However, the earth can filter only a limited amount of material. Waste oil should be recycled. Recycling centers are located throughout the Commonwealth, usually at service stations. For more information, inquire at your local service station or oil distributor.
6. Do not enclose a well inside a dog or stock pen. Remember, wells are direct openings to the water table, so the potential for contamination is very high near the well. The regulations for water well construction specify the minimum distances a well must be located from potential sources of contamination. In most cases, it is best to increase that distance, if possible.
7. Old wells are often found to be contaminated with bacteria. This may be caused by a lack of casing or insufficient casing, or by cracked or improperly sealed casing. Older wells can be "reworked" and brought up to the standards at a cost which is generally much less than drilling a new well. Reworking a well includes pulling out the old well casing, cleaning out the sediment, installing a new well casing and sealing it in the drill hole, and disinfecting the well upon completion. The well may need to be deepened or reamed (drilling the hole to a larger diameter to allow proper casing and sealing). In most cases, reworking a well will increase the water flow to the well and prevent near surface contamination from entering the well. As a result, the well should be free of contamination from bacteria.
8. If your well is cut off below ground level, you should have a certified water well driller extend the casing above ground. Buried wells tend to develop leaks over time and allow contamination to enter your water supply. Wells which extend above the ground make pump maintenance and repair easier and cheaper. If bacterial growth starts in a buried well, you cannot disinfect without digging up the well.

9. Unused or abandoned wells should be properly plugged to prevent possible contamination of groundwater and to maintain the pressure and yield of the aquifer. When a well is not used, it may develop leaks and introduce contaminants into the groundwater, which may cause problems for other wells in the area. When a well is being used, such leaks are easily detected, but in unused wells, leaks are usually found only after another well goes bad. Unused wells should be sealed from bottom to top with a material which will prevent the flow of water down the wells. Contact your certified water well driller or the Division of Water for more specific details.
10. Abandoned or dry water wells should not be used for disposal of wastes of any kind, particularly sewage. The injection of waste into a source of underground drinking water is banned by Federal law. This practice can adversely affect the health and safety of others in the area who use groundwater.
11. Your septic system should be properly located and maintained. Septic system wastewater carries disease-causing bacteria and viruses into the soil. A septic tank which is leaking or a drain field which is not operating properly or is poorly designed, may allow contamination to enter groundwater and your well.
12. Keep all records concerning your well together in a safe place. This includes your well construction form, any test results, and repair work records. This information is important to assist you with any problems you may have with your well.
13. You and your neighbors may wish to form a groundwater protection group to safeguard your groundwater supplies. Such a group might be able to negotiate a discount on well drilling or reworking if several wells in the area need work at the same time. The Division of Water currently provides assistance to such groups in water resource protection through the "WATER-WATCH" program. For details contact the Division of Water.

**COMMERCIAL LABORATORIES CERTIFIED TO PERFORM
DRINKING WATER ANALYSES IN KENTUCKY**

LABORATORY

CERTIFIED FOR:

Anitech Laboratory
Subsidiary of Summit Engineering
P. O. Box 933
Pikeville, Kentucky 41501
Phone: (606) 437-4069

Bacteriology

Beckmar Environmental Laboratory
Professional Towers - Suite 309
4010 Dupont Circle
Louisville, Kentucky 40207
Phone: (502) 896-9505

Bacteriology
Fluoride

Commonwealth Technologies, Inc.
2520 Regency Road - Suite 104
Lexington, Kentucky 40503
Phone: (606) 276-3506

Bacteriology
Inorganics*
Organics*
Trihalomethanes
Sodium/Corrosivity

Environmental Laboratories, Inc.
P. O. Drawer 2309
Gulfport, Mississippi 39503
Phone: (601) 863-3036

Radionuclides*

Morehead University
Water Testing Laboratory
UPO Box 804
Morehead, Kentucky 40351
Phone: (606) 783-2961

Bacteriology

McCoy & McCoy, Inc.
Environmental Consultants
P. O. Box 907
85 East Noel Avenue
Madisonville, Kentucky 42431
Phone: (502) 821-7375

Bacteriology
Inorganics*
Organics*
Trihalomethanes
Sodium/Corrosivity

McCoy & McCoy, Inc.
Environmental Consultants
1800 Kentucky Avenue
Paducah, Kentucky 42001
Phone: (502) 444-6547

Bacteriology
Radionuclides*
Fluoride

McCoy & McCoy, Inc.
Environmental Consultants
P. O. Box 208
Pikeville, Kentucky 41501
Phone: (606) 432-3104

Bacteriology

Northern Kentucky Environmental Services
300 Doctors Building
33 East Seventh Street
Covington, Kentucky 41011
Phone: (606) 431-6224

Bacteriology
Inorganics*

Resources Management Institute
Western Kentucky University
Bowling Green, Kentucky 42101
Phone: (502) 745-5287

Bacteriology

Standard Laboratories, Inc.
2101 South Main Street
Corbin, Kentucky 40701
Phone: (606) 528-0751

Bacteriology

T. M. Regan, Inc.
337 Waller Avenue
Lexington, Kentucky 40502
Phone: (606) 254-3831

Bacteriology
Inorganics*
Organics*

NON-COMMERCIAL LABORATORIES

Division of Laboratory Services
Department for Health Services
275 East Main Street
Frankfort, Kentucky 40621
Phone: (502) 564-4446

Bacteriology
Inorganics*
Organics*
Fluoride

*These terms encompass many compounds or elements for which specific analyses may be required. To determine the current status of a particular laboratory with respect to a particular analysis, contact the

Division of Environmental Services at (502) 564-2150. This list will be updated to keep it current and may be obtained upon request by contacting:

**Kentucky Division of Water
Drinking Water Branch
18 Reilly Road
Frankfort, KY 40601
Phone: (502) 564-3410**

LIST OF TERMS

Annulus or annular space- the space between a well bore and the well casing.

Aquifer- a water-bearing formation which transmits water in sufficient quantity to supply a well or spring.

Casing- a pipe, generally metal or PVC, which is installed in a drilled, bored, augered or driven hole to maintain the well opening and prevent contaminants from entering the well.

Coliform bacteria- organisms found in the gut cavity of animals, including man, whose presence in water is an indicator of pollution and potentially dangerous bacterial contamination.

Completion of a well- the point at which a water well contractor has constructed, developed, disinfected and covered a well with a sanitary seal. This includes installation of a pump if he is requested to do so by the well owner.

Contaminant- any undesirable physical, chemical, biological or radiological substance or matter in water.

Development of a well- process undertaken after the well is constructed to remove any silt, fine sand, drilling mud, etc. from a zone immediately around the pump or well screen. Development makes the aquifer more permeable and stable and provides the well owner with a sufficient yield of water that is clear and relatively free of suspended matter.

Frost pit or well pit- any excavation which is dug for the purpose of terminating a well below the ground surface, commonly practiced in the past to prevent freezing. Such structures are illegal in Kentucky and are now unnecessary due to pitless adapters.

Groundwater- that part of subsurface water which occurs in the zone of saturation.

Pitless Adapter- a watertight unit designed and constructed for permanent attachment to the well casing below the frost line. It provides necessary vent, electrical and discharge pipe connections while preventing the entrance of contaminants into the well and freezing of the water discharge pipe. It also permits termination of the well above the ground surface which is required by law.

If you have further questions about groundwater or water well drilling, please contact one of the following agencies:

Kentucky Division of Water
Department for Environmental Protection
18 Reilly Road
Frankfort, Kentucky 40601
(502) 564-3410

Kentucky Division of Food and Sanitation
Department for Health Services
275 E. Main Street
Frankfort, Kentucky
(502) 564-3722

Information regarding the water well drilling profession may be obtained from:

National Water Well Association
6375 Riverside Drive
Dublin, OH 43017
(614) 761-1711

Kentucky Water Well Association
Box 8
Guston, Kentucky 40142
(502) 547-7800

Sources :

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Kentucky Water Well Construction Practices and Standards, 401 KAR 6:300 and 6:310.

Scalf, Marion R., et. al., Manual of Ground-water Quality Sampling Procedures, U.S. Environmental Protection Agency, September, 1981.

Standard Methods for the Examination of Water and Wastewater, Sixteenth Edition, published by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation, 1985.

Well Drilling Operation, reprinted by the National Water Well Association with permission from the Department of the Army and the Air Force, no date.



***Printed With State Funds
PAM-DFS-301 (6-86)***

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