- **Bacteria** - Bacteria can enter a well through several ways. During the drilling process and when the pump is installed bacteria can be introduced. The most common type of bacteria is coliform bacteria. Coliform bacteria are part of a large group of various species of bacteria, they occur naturally in the intestines of warm blooded animals, and are an indicator of possible contaminants. *E. Coli* is a fecal coliform that can be present in a water sample and is an indicator of sewage contamination in the well which can be indicative of other disease causing bacteria.

How to Chlorinate a Well

- **Amount to use** - The amount of chlorine required to adequately disinfect a well is dependent on the diameter of the well and the depth of the well (table below). Standard liquid bleach is at 5.25%. A new well should be chlorinated at a concentration of 250 mg/l, an altered well should be chlorinated at 500 mg/l. The chlorine level may need to be raised if there is a presence of iron or sulphur in the water. Below is an example:
  - For a new 5 inch diameter well that is 100 ft. deep with a static water level of 60 ft.. There will be 1.0 gallons of water per foot of casing. Therefore 40 gallons of water needs to be disinfected. Divide .00025 mg/l by .0525 and multiply by 40. This comes to .38 gallons of chlorine to be added.

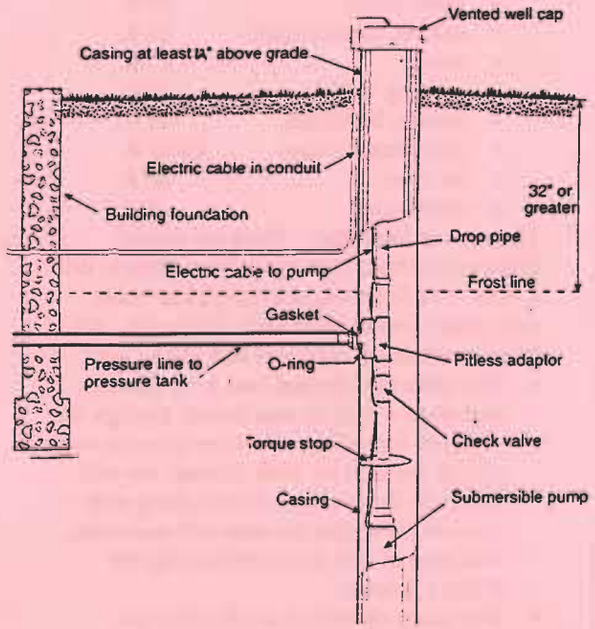
Volume of water	
Diameter of well (inches)	Gallon per ft. of water
3	0.37
4	0.65
5	1
6	1.5
8	2.6

- **Mix** - Mix the recommended amount of chlorine with water in a 5 gallon bucket.
- **Remove well cap** - The well cap should be carefully removed and the correct amount of bleach is to be poured into the well.
- **Recirculate** - A hose should be hooked up and run into the well until the smell of bleach is detected. The hose water should be run down the sides of the casing to rinse them down with the chlorinated water. This should be done for 15-20 minutes.
  - The hose should be shut off, and then you should turn on every water fixture throughout the home until the scent of bleach is detected. It is advised that you turn off your water heater. Any softeners or other treatment equipment should be cleaned and sanitized per manufacturers instructions.
- **Disinfection Time** - The water should be turned off and let to sit in the pipes for 8-12 hours.
- **Removal of chlorine** - After it has set for the recommended time the chlorinated water is to be removed through an outside hose to a safe area. Do not discharge all of the chlorine to the septic system. Run the water until the chlorine smell is gone.
- **Sampling** - A water sample can be taken 48 hours after the chlorine is completely removed from the system.

This information provided to you by your local health department:

CRAWFORD COUNTY
GENERAL HEALTH DISTRICT
130 N. WALNUT ST., SUITE B
BUCYRUS, OHIO 44820

YOU AND YOUR WATER SYSTEM



What is a Water Well

Residential homes not provided with municipal water supplies must rely on a well (or alternative system) for their drinking water. The following is a description of what needs to be done to have a well drilled and what comprises a well. A new well may be needed when building a new home or for an existing home that is having problems (no water, little water, bad water) a well will need to be drilled.

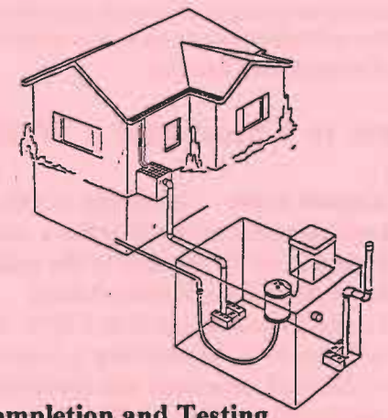
- **Permit required** - A permit is required prior to a well (or alternative) being drilled or a well being altered. The health department has to go out to the site and verify the site and proper distances.
- **Distance Requirements** - The following is a brief listing of required minimum distances for a water supply:

• sewer pipe	10 ft.
• underground fuel oil	50 ft.
• sewage tanks	50 ft.
• septic fields	50 ft.
• stables, manure piles	50 ft.
• roads	25 ft.
• existing wells	10 ft.
• houses, buildings	10 ft.
• geo-thermal loops	25-50 ft.
• lot lines	10 ft.
• driveways	5 ft.

- **How a well is drilled** - There are several different methods used throughout Ohio to drill a well. The following are those used: cable tool; rotary (mud and/or air); and auger. All of these methods are approved and can be used.
  - The cable tool method uses a rig that lifts and drops a drill bit that breaks through the soil/rock formations. A water slurry is used to help the drill bit work through the soil. Typically the casing is driven along with the drill bit so that the hole will stay open. This type of well is grouted during the drilling process.
  - The rotary rig utilizes mud and/or air. Typically in Crawford County a mud rotary is used. A drill bit is used along with water and/or a drilling mud that is re-circulated while the drill bit is rotated down into the soil. When water is reached the drill bit and rods are removed and a casing is put in place. The well is then pressure grouted to ensure a tight seal.
  - The auger method utilized in Crawford County is a bucket auger. An oversized borehole is drilled with the auger, typically anywhere from 12-30 inches in width. The well is then cased and grouted. This method typically results in a larger well casing diameter pipe.
- **Well casing** - A well casing must be of an approved material and extend 12 inches above the ground. The casing can be a steel casing, PVC, or concrete. It's purpose is to hold open the borehole and prevent contaminants from entering the water supply.
- **Well caps** - All wells installed or altered after January 2000 are required to have a weather tight and vermin proof well cap. An improper well cap can allow dirt and insects into the well therefore contaminating the well. It is also recommended that any existing wells switch to the new caps.
- **Screens** - A screen must be installed when a well is drilled in sand/gravel, and may be utilized in other formations to prevent collapsing of the hole. It should have uniform openings and be an approved material. Typically a plastic screen is utilized, but a metal one can be used.
- **Gravel/filter pack** - A gravel/filter pack is used by the driller to prevent fines from entering the well through a screen. The gravel/filter pack is placed over part of the screen then upward above the screen.

Alternative Systems

- **Hauled Water Storage Tank** - This is a concrete or plastic tank that is typically placed underground. The minimum size is 1000 gallons. Water is brought in on an as needed basis from a licensed hauled water delivery company.
- **Cistern** - This is a concrete or plastic tank placed underground and is filled by water runoff from the roof. The minimum size is 2500 gallons. A roof washer or filtering device is required. For every 1500 sq. ft. of roof there is to be one roof washer. The water must be continuously disinfected through an approved method. It is also recommended that a cyst filter be used.
- **Ponds** - Ponds are to only be considered as a last resort for a water supply. Detailed plans must be submitted, a cyst filter must be used, and a continuous disinfection device is required. Contact the health department for further information.



Well Completion and Testing

- **Chlorinating** - If the well driller installs your pump they are required to chlorinate the well after their work is completed. If the well driller is not installing the pump then they must chlorinate and then the individual who installs the pump will also chlorinate the well. The amount of chlorine used will depend on the diameter of the well and the depth. Anytime any work is done on a well it should be chlorinated to remove contaminants.
- **Testing** - All new and altered wells are required to be tested for coliform bacteria and nitrates. If a sample comes back positive (unsafe) then the well must be re-chlorinated and tested again. The acceptable level for coliform bacteria is zero, and for nitrates is 10 mg/l. For new or altered wells one water sample is included in the permit fee. For additional samples there is a charge, please contact the health department for the current fee. Water samples are typically taken on Tuesday afternoons and you must call to set up an appointment.