

# CABARRUS HEALTH ALLIANCE

## Bacterial Water Sample Information

A bacterial water sample taken from your well has **tested positive for the presence of coliform bacteria**. The Cabarrus Health Alliance will resample the well after it has been properly disinfected/shock chlorinated. Please look at the information provided with this letter about the proper method of disinfecting/shock chlorinating your well. If there are any questions regarding this information or you are requesting a resample please call the Environmental Health Department of Cabarrus Health Alliance at (704) 920-1207

Warning: For your safety and health it is our recommendation that the water straight from the well not be used for human consumption until it is boiled. Boiling is one method for temporarily removing bacteria from water used for drinking, food preparation, dishwashing or teeth brushing. Water should be boiled for one full minute.

### [Coliform Bacteria and Drinking Water Q & A](#)

**Q: If test results indicate that bacterial contamination is occurring, what does that mean?**

**Answer:** Testing drinking water for all possible pathogens is complex, time-consuming and expensive. It is relatively easy and inexpensive to test for coliform bacteria. If coliform bacteria are found in a water sample

**Q: If coliform bacteria are found in a water sample what does this mean?**

**Answer:** Coliform bacteria are organisms that are present in the environment and in the feces of all warm-blooded animals and humans. Coliform bacteria will not likely cause illness. However, the presence of coliform bacteria in drinking water indicates that disease-causing organisms (pathogens) may be present in the water system. Most pathogens that can contaminate water supplies come from the feces of humans or animals. There are two different groups of coliform bacteria that drinking water samples are routinely tested for; **1) Total Coliform 2) Fecal Coliform**. Total Coliform & Fecal Coliform, are all indicators of drinking water quality. The total coliform group is a large collection of different kinds of bacteria. The fecal coliform group is a sub-group of total coliform and has fewer kinds of bacteria. When a water sample is sent to a lab, it is tested for total coliform. If total coliform is present, the sample will also be tested for fecal coliform.

**Q: How could bacteria enter the water system?**

**Answer:** Don't always blame the water first. Water in a recently drilled well is subject to contamination by the drilling operations; installing a new submersible (in-well) pump and well line or foot valve means pulling the piping out of the well, lying it on the (insanitary) ground surface, and then replacing it in the well. The well should have been disinfected after such work but many times this cannot be done properly because there is no electricity to the well to recirculate the chlorine solution throughout the well. It is therefore, necessary to disinfect or shock chlorinate the well to destroy bacterial contamination present in the well system at the time of disinfection. In order to achieve a satisfactory disinfection of the system, the bacteria must be brought in contact with a chlorine solution of sufficient strength and remain in contact with that solution for a sufficient time to achieve a complete kill of all bacteria and other microorganisms.

Shock chlorination is not intended to kill bacteria that might be introduced at a later time. Follow up samples can determine whether or not the contamination of the well is an ongoing concern. If the source of the contamination is due to an ongoing situation, for example bad ground water source, then continuous disinfection of the water system will solve the problem.

If treatment is necessary, there are a number of ways of addressing bacteriological concerns. Biological contaminants are

Most effectively eliminated through chlorine disinfection, filtration, ultraviolet irradiation and ozonation. All methods must be properly designed for the intended use and properly maintained. Additionally, bacterial analysis of the treated water must be made with sufficient frequency to ensure adequate treatment.

**TOTAL COLIFORM BACTERIA** are commonly found in the environment (e.g., soil or vegetation) and are generally harmless. If only total coliform bacteria are detected in drinking water, the source is probably environmental. Fecal contamination is not likely. However, if environmental contamination can enter the system, there may be a way for the pathogens to enter the system. Therefore, it is important to determine the source and to resolve the problem.

**FECAL COLIFORM BACTERIA** are a sub-group of the total coliform group. They appear in great quantities in the intestines and feces of people and animals. The presence of fecal coliform in a drinking water sample often indicates recent fecal contamination - meaning there is a greater risk that pathogens are present than if only total coliform bacteria is detected.

### Questions/Contact Information

*If you have any questions about disinfecting your well, please call the Aquifer Protection Section Regional Office for your area. The following is a list of Regional Offices.*

*Asheville Regional Office 2090 U.S. Highway 70 Swannanoa, NC  
28778 • Phone: (828) 296-4500*

*Fayetteville Regional Office 225 Green Street, Suite 714  
Fayetteville, NC 28301 • Phone: (910) 433-3300*

*Mooresville Regional Office 610 East Center Ave. • Suite 301  
Mooresville, NC 28115 • Phone: (704) 663-1699*

*Raleigh Regional Office 3800 Barrett Drive, Suite 101 Raleigh, NC  
27609 • Phone: (919) 791-4200*

*Washington Regional Office 943 Washington Square Mall  
Washington, NC 27889 • Phone: (252) 946-6481*

*Wilmington Regional Office 127 Cardinal Drive Extension  
Wilmington, NC 28405 • Phone: (910)-796-7215*

*Winston-Salem Regional Office 585 Waughtown Street Winston-  
Salem, NC 27107 • Phone: (336) 771-5000*

*Water well disinfection procedures are outlined in Title 15A North  
Carolina Administrative Code, Chapter 2C, Section .0111. The  
information in this pamphlet is a summary of those requirements.*

*To get complete copies of these rules you may download them  
from our web page at [www.ncwaterquality.org](http://www.ncwaterquality.org) or contact us at  
the following address:*

*DWQ, Aquifer Protection Section 1636 Mail Service Center Raleigh,  
NC 27699-1636 Phone (919)733-3221 • Fax (919)715-0588  
[www.ncwaterquality.org](http://www.ncwaterquality.org)*



## Disinfection or Chlorination

**F**or many of us, a water supply well represents the sole source of water for our home.

Disinfecting your water supply well and piping system is an effective way to ensure that your water is sanitary and safe to drink. Disinfection of a water supply well is necessary if test results indicate bacterial contamination. Chlorination of your well, piping system, and water heater is also necessary if your well is contaminated by flood water.

Disinfection may be used to control iron and sulfur bacteria to a limited degree. You may also wish to chlorinate your well as part of an annual well maintenance practice. In addition, all water wells are required to be disinfected upon completion of construction, maintenance, repairs or pump installation and testing.

The standard method of disinfection is to produce a 100 parts per million (or 100 milligrams per liter) chlorine concentration in your water. Another type of chlorination termed “shock chlorination” uses the same methods to introduce chlorine but achieves at least a 200 parts per million residual chlorine or more.

Shock chlorination is typically recommended when test results indicate the presence of bacteria.



## How to Chlorinate Your Water Supply Well

When you chlorinate your well, you should use safety goggles, gloves and protective clothing. Follow the chlorine product manufacturer’s instructions. Concentrated chlorine can produce holes in clothing and skin burns. You should use only a solution made from high test calcium hypochlorite containing 65% - 75% available chlorine. Do not use household bleach. High test calcium hypochlorite, including trade names HTH and Chlor-Tabs, is available from home improvement stores, swimming pool product suppliers, and drill shops. Do not use stabilized chlorine tablets or any chlorine product that contains fungicides, algaecides or other disinfectants; read the product label carefully.

Fecal Coliform



You may wish to ask the well contractor that installed your well if they have these products available. To determine the amount of chlorine or calcium hypochlorite needed to produce a 100 parts per million residual chlorine solution, you must follow the four steps below

**USE THE AVAILABLE WORKSHEET TO RECORD YOUR ANSWERS TO EACH STEP**

**1) Determine the thickness of the water column in your well.**

To accomplish this, you must determine the depth to water from the ground surface and subtract this number from the total depth of the well. These numbers should be recorded by the driller on the well tag located on the well casing. If not, you can contact the drilling company that drilled the well. Example: The total well depth is 150 ft. and the water level is 20 ft. below ground surface. Therefore, the thickness of the water column is 130 ft.

**2) Determine the volume of water in the well.**

Use table 1 below to determine the gallons per foot of water in your well.

Well Casing Diameter	Gallons per foot
2	0.163
4	0.65
6	1.47
8	2.61
10	4.08
24	23.5
30	36.72
36	52.87

*Multiply the gallons per foot of water in your well by the thickness of the water column determined in Step 1. Our example in Step 1 had 130 ft. of water in the well. Our example well has a 6-inch casing diameter so it has 1.47 gallons of water per foot of water column (see Table 1). Therefore, 130 ft x 1.47 gallons per foot = 191.1 gallons of water in the well.*

**3) Estimate the amount of water in the house plumbing system.**

One estimate for a house would be close to 100 gallons. Add this to the answer from Step 2. For our example from Step 2: 191.1 gallons of water in well + 100 gallons in plumbing system = 291.1 gallons of water needing to be disinfected.

**4) Determine the amount of calcium hypochlorite to add to the system.**

When using hypochlorite that is listed as 65% to 75% available chlorine, you would add 3 ounces of high test calcium hypochlorite per 100 gallons of water in the system. For our example from Step 3: Divide 291.1 gallons by 100 gallons and multiply by 3 ounces = 8.73 ounces of calcium hypochlorite. To use the shock chlorination method, multiply the total system volume by 6 ounces per 100 gallons of water.

## Your worksheet:

- Step 1:**
- a) Total well depth \_\_\_\_\_ ft.
  - b) Depth to water \_\_\_\_\_ ft.

Thickness of water column: subtract answer (b) from answer (a) = \_\_\_\_\_ ft.

**Step 2:**

Using Table 1, determine your well diameter and record the gallons per foot \_\_\_\_\_.

Multiply your gallons per foot by the answer from Step 1. This equals the water volume in the well. Record answer here \_\_\_\_\_.

**Step 3:**

Add to the result of Step 2 the estimated amount of water in the piping system such as 100 gallons. Step 2 answer + 100 gallons = \_\_\_\_\_ total gallons in system and well.

**Step 4:**

Divide Step 3 answer by 100 (Step 3/100). Take this number and multiply by 3 ounces for 100 ppm solution or 6 to shock chlorinate the well. This equals the amount of high test calcium hypochlorite you are to add and mix in the 5 gallon bucket.

Answer \_\_\_\_\_ ounces. \*Follow manufacturer's directions for storing, transporting, and using calcium hypochlorite

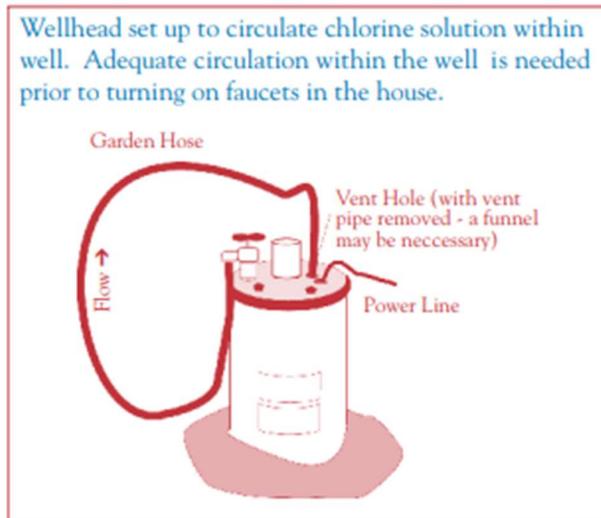
Begin by attaching a garden hose to the well's hose bibb or an outside faucet closest to your well. Fill a five gallon bucket about 3/4 full with water. Loosen the well seal at the top of your well. This is typically accomplished with a wrench and it may be necessary to bump the seal with a rubber mallet to loosen it. If you are unable to remove the well seal, you can introduce the chlorine solution through the vent hole using a funnel. The vent pipe is easily unscrewed. However, it is better to pour the chlorine solution directly into the well in order to wash down the sides of the casing with the chlorine solution.

Add the calculated amount of calcium hypochlorite to the five gallon bucket of water and mix to dissolve. Pour the chlorine solution into the vent opening using a funnel or in through the top of the well casing after removing the well seal. Special provisions will be required for introducing the chlorine solution into artesian wells (flowing well). Contact the appropriate regional office for more information.

Place the end of the garden hose so the discharging water will flow into the well either through the top of the well casing or slowly through the funnel positioned in the vent hole. Turn the hose on and allow the water to run until a strong chlorine odor is noticed coming from the hose. Allow the hose to run water into the well for about an hour or enough time to thoroughly circulate the chlorinated water.

Once the chlorine has been placed in the well, turn on each discharge point of the system (faucet etc.) until a strong chlorine odor is noted then turn off the faucet. Let the chlorine solution sit in the system for at least 24 hours. Do not use the system during this time as chlorine will be flushed to your septic system.

Before resuming use of your water system, you must rid the system of the chlorinated water. To flush the system, run water from an outside faucet until the chlorine odor no longer remains. When flushing the system, drain the chlorine water away from plants and animals. Do not allow the chlorine rich water to enter any surface water body or storm sewer.



### After Disinfection

*If your well tested positive for bacteria before, it is important to get the water retested after disinfection. You can retest the well for bacteria about seven-to-ten days after disinfection. Remember that you must identify and remedy the source of the bacteria to keep the problem from recurring. The presence or absence of "indicator" bacteria such as total coliform determines if your water supply well is sanitary. Usually a properly constructed well can be effectively disinfected. However, if tests indicate that bacteria remain, you may need to have the well inspected. Foreign matter in the well such as animals, insects or bits of wood will have to be manually removed and the well disinfected again. Make sure the wellhead is properly sealed at all entry points. Cracks in the well casing will also allow bacteria to enter the well. If your well is in disrepair, it may be a good idea to drill a new well in accordance with the current regulations. If you have questions about disinfection or other well issues, please call your regional office.*