Well Disinfection Procedures

By Hillbluffer

It is a sure thing that having a safe and secure water supply during a time of crisis can make a vast difference in your quality of life. A retreat that has to devote time to acquiring water because its onsite system has failed or is contaminated greatly decreases it's value as a safe haven. During my normal work day now, I encounter numerous wells that are of substandard construction and many times they are contaminated with some sort of bacteria. This is unnecessary and could possibly become dangerous to the health of you and your family if left untreated. Whenever you have a well installed or an existing well repaired or upgraded, you introduce bacteria into the system. A well driller or contractor introduces bacteria when they work on your system and so must disinfect your well when they complete the tasks for which they were contracted. However, many times this is not done or done badly or ineffectually and you must do it. Anyway it doesn't hurt for you to disinfect your well on a regular basis as part of a regular maintenance program. Also, there may be occasions where the water in a well is suspect and you will want to disinfect it yourself just to be sure.

Most of the bacteria picked up and introduced into a well system are nonpathogenic. However the bacteria normally used as an indicator of the presence of disease producing bacteria is usually among them. This indicator bacteria is know as coliform bacteria and is taken as evidence that the water may contain disease producing organisms (fecal coliform) that normally live in the intestinal track of man and other warm blooded animals. The identification of the actual disease-producing microorganisms is usually difficult and expensive. The efficiency of the disinfection process is not measured by the absence of any pathogenic bacteria but by tests for the number of coliform bacteria present (EPA 1978). So if the disinfection process shows no or low concentrations of coliform bacteria then the pathogenic bacteria is not a threat.

The four major types of pathogenic organisms that affect the safety of drinking water are bacteria, viruses, protozoa and occasionally worms. Of these, the bacteria and Protozoa infestations cause Typhoid, cholera and dysentery. Water from a well is considered bacterially safe to drink if the coliform concentration (count) is 1 coliform bacteria per 100 milliliters (ml). This is the national standard. I guess everyone knows that the best way to disinfect a well is to use chlorine. It's cheap and it's effective. Chlorine kills bacteria on contact, but it won't touch a virus. That's another story.

To treat your well with chlorine you have to put enough chlorine in the well to kill the bugs and you have to leave it in the well long enough to finish the job. Normally you want a chlorine concentration of at least 50 milligram per liter (mg/l) and you want a minimum of 12 hours in the system. Frankly, I like 24 hours in the system as the killing time, but those are the minimums. A system may need a higher concentration depending on your local conditions. Water systems with high pH's and high turbidity in the water require more chlorine and more time in the system. Regular testing of your well is also a preventative maintenance tip. Many health departments do this free. Know the water chemistry in your area. It's not hard and is probably on record now. One thing you need to remember, when the chlorine is in the system don't drink the water! Wait until the killing time is over and flush the system. If you don't believe this and try it, you will!

Another important point, when you flush your system out after allowing the chlorine to sit and work, you should smell a slight chlorine odor at the faucet from where you're draining your system. This means your system absorbed the necessary amount of chlorine needed to clean your system but you had a little extra that is present as free residual chlorine. If there is no slight chlorine odor then there is a possibility that you didn't have enough chlorine in the system to completely clean it. You will need to repeat the procedure. Do this to make sure of your system safety. In the professional area, a water tester will not OK a new system until a chlorine test has been completed with a detectable amount of residual chlorine showing up in the test.

I've seen drillers who want to make sure they disinfect a well so they dump a couple double handfuls of granular Calcium Hypochlorite down the well to start the process. This takes care of the well but when that slug of chlorine hits your septic tank its takes care of those bugs to. Some drillers will put the chlorine in as soon as the well casing is set. That way they have all-day or so for the chlorine to work. They will pump the system later after they set the pump. Most of the time this water is discharged from a drain valve at the wellhead. So your pipes don't get disinfected. If this is the case, you may want to discharge the water through an outside faucet to the open air not to your septic tank.

OK, your well is in place and it's been a year or 10 or so and you want to disinfect it for your on protection. How do you get a solution that will disinfect your well and not wipe you septic system clean? The following table may help.

Table 1: Quantity of Substance required to produce a 50ppm Concentration of Chlorine

Ounces of Compound for each 10-ft Depth of water			
Well Diameter (inches)	70% Calcium Hypochlorite (Oz.)	12% Liquid Sodium Hypo-chlorite* (Fl. Oz.)	Household Bleach (Fl. Oz.)
	Dry Measure	Liquid Measure	Liquid Measure
2	0.02	0.09	0.21
4	0.06	0.35	0.81
6	0.14	0.78	1.88
8	0.25	1.39	3.33
10	0.39	2.2	5.21
12	0.56	3.2	7.51
24	2.24	12.8	30.00
36	5.03	28.2	67.51

All quantities may be rounded to the nearest half-ounce for convenience of measurement (128 fl. oz. = 8 pt. = 4 qt.=1 gal).
*1-heaping teaspoon of 70% hypochlorite is approximately ½ ounce

Example: A 6-inch diameter well, 100 feet deep with the water 20 feet below ground level has an 80 foot water column. To disinfect with household bleach you would need 1.88 ounces of bleach for every 10 feet of water. (8 X 1.88 = 15.04 fluid ounces).

If the well depth is not known use 1 gallon of liquid bleach instead of the above amounts. The process is not dependent on you being precise but there's no need to overdo it either. In your own private well you be the judge.

There are other methods for well disinfection but this one is simple and can be done by anyone with easily attained materials.