

DISINFECTION OF PRIVATE WELLS

A common problem with New Jersey well waters is bacterial contamination. These bacteria may or may not be harmful. Since it is difficult to test well water for all types of harmful and harmless bacteria, a certain group, known as coliform organisms live in the intestinal tract of warm-blooded animals, (e.g. man), hence they are excreted in large numbers. Any well water that shows the presence of coliform bacteria is considered contaminated and should be disinfected.

Conditions that May Cause Contamination of Existing Wells

Well waters may become contaminated by coliform bacteria from any of the following conditions:

1. Loose or worn seal on drilled and driven wells.
2. Defective, too short, or inadequately sealed casings in drilled and driven wells.
3. Cracked or loose fitting cover on a dug well.
4. Defective wall lining, or cracked concrete apron of a dug well.
5. Repair to well structure or submerged pump.
6. Flooding of the well due to hurricanes, floods, heavy rainfall, or other natural disasters.
7. After breakdown and repair of a septic tank system.
8. Wells drilled into fractured rock formations.
9. Wells located in areas where ground waters are subject to continuous contamination from outside sources.

When Wells Should be Disinfected

Well waters should be disinfected whenever any of the following situations prevail:

1. Suspected contamination by any one of the nine conditions listed above.
2. After repair to an existing well or pump.
3. After construction of a new well and before any water is used.
4. Upon receipt of a laboratory report showing an unsafe coliform bacteria analysis.

Methods of Temporary Disinfection

1. **Boiling the Water** - If there is known or suspected contamination, the water from the well should be brought to a complete and vigorous boil for one minute (not including the time it takes to come to a complete boil). This is a simple and effective way of providing immediate disinfection for small quantities of water. It does not provide treatment, however, to all the water in the well or the water in the distribution system.
2. **Chlorination** - If a well is temporarily contaminated by coliform bacteria, disinfection is accomplished most effectively with a chlorine-containing chemical. Any common household liquid bleach that contains approximately 6% "active" ingredient, usually sodium hypochlorite, is the most convenient chemical

to use. The following table shows the proper amount of liquid bleach to be added directly to the well.

METHOD FOR DISINFECTION DRINKING WATER WELLS

VOLUME OF 6% BLEACH SOLUTION (ULTRA) REQUIRED (Disinfection Strength Approx. 50 ppm.)

DIAMETER OF WELL

WELL DEPTH

	20ft	30ft.	40ft.	50 ft.	100 ft.	200 ft.
up to 6"	4 ounces	6 ounces	8 ounces	10 ounces	20 ounces	32 ounces
6"-12"	16 ounces	24 ounces	32 ounces	2 quarts	3 quarts	4 quarts
12"-24"	2 quarts	3 quarts	4 quarts	-----	-----	-----
24"-48"	2 gallons	3 gallons	4 gallons	-----	-----	-----

In the case of shallow dug wells, the chlorine solution can be added directly to the water by simply raising the cover, whereas the seal on existing driven and drilled wells must be removed first. After adding the solution, make sure that the well seal or cover is properly replaced.

Allow the chlorine solution to remain in the well for at least six hours, or preferably overnight. After this period of time, open a tap and let water run to waste until the odor of chlorine is detected. Close tap and let the chlorinated well water remain in the distribution system for at least one hour. Thereupon let water run to waste until the odor and taste of chlorine is no longer noticed. The water may now be used for all general household purposes except drinking.

To assure its safety for drinking the well water should now be tested for coliform bacteria. Allow at least 24 hours before taking the sample. This will assure that all the water in the well has been replaced with fresh water from underground sources.

The test will indicate the effectiveness of disinfection. If coliform organisms are still present, this suggests that the ground water is continuously contaminated. In this case, the "one-shot" or temporary method of disinfection described above is not adequate, hence a permanent method of treatment is required.

METHODS FOR DISINFECTING SMALL VOLUMES OF WATER FOR DRINKING

(Clean Up and Disinfection After Floods)

Product	Available Chlorine %	Stock Solution	+* Quantity of Stock Solution per Gallon of Water @ 5ppm
Bleach (ULTRA) Store Label Clorox Ultra	Fresh product Only 6% (range 5-10%)**	Use full strength	8 drops
Sodium Hypochlorite	10%	Use full strength	4 drops
Sodium Hypochlorite	15%	Use full strength	3 drops
Calcium Hypochlorite/ Chloride of Lime	25%	6 heaping tablespoons (3 oz.) to 1 Quart/water	1 teaspoon or 75 drops
Calcium Hypochlorite	33%	4 heaping tablespoons (2 oz.) to 1 Quart/water	1 teaspoon
HTH Pitchlor Perchloron	70%	2 heaping tablespoons (1 oz.) to 1 Quart/water	1 teaspoon
Iodine (USP Tincture of Iodine)	2% Iodine	Use full strength	20 drops/gal/clear water 40 drops/gal/cloudy water

*If the water to be disinfected appears cloudy or colored, strain water through a paper coffee filter or clothe (e.g., cheese cloth, etc.) then add required disinfectant dosage. Stir water, let water stand for at least 30 minutes before it is used. Be sure to use fresh disinfectants and do not be afraid to use slightly more disinfectant than is needed.

**The Clorox Company Material Safety Data Sheet.

Permanent Means of Disinfection

Before the installation of permanent means of disinfection, the home owner should be sure that the contamination originates from the ground water, and is not a temporary condition. This is indicated by tests which show the presence of coliform bacteria even after the well has been disinfected, and after making sure that the well is properly constructed and protected. Also, there are areas where wells and septic tanks are so crowded together that it is almost certain that the ground water is subject to continuous contamination. In these situations, permanent disinfection may be effected through the use of a machine that feeds chlorine continuously into the water, i.e. "home chlorinators."

There are many types of commercially available home chlorinators but most work on the principle of feeding a chlorine solution, whenever the well pump operates. These units are located on the discharge side of the well pump and before the pressure storage tank. Some of the chlorinators feed just enough bleach, approximately 1-2 parts per million (p.p.m.) to effect adequate disinfection and yet leave a small residual, 0.2-0.5p.p.m. of chlorine as a safety factor. Other units feed the bleach at higher dosages in the range of 5-10p.p.m. (so-called super-chlorination). In this case, the high residual chlorine imparts an objectionable taste to the water, hence a dechlorination unit must be installed after the pressure storage tank.

Frequency of Bacteriological Tests

It is recommended that well waters be tested at least twice a year for coliform bacteria. More frequent tests may be needed in areas heavily concentrated with wells and septic tanks. These tests may be done by a number of commercial laboratories.