

## Presence/Absence Technique

This standard water test involves introducing an enzyme powder to 100 mL of water. After an incubation period of 24 (possibly up to 48) hours, a positive result is indicated by a change in color from yellow to magenta. To determine if *E.*

- Was the sample properly taken?  
(We remove the faucet aerator which can harbor bacteria, and suggest running at least 5-10 minutes of water, 24 hours if house is unoccupied, and fill the container without touching its interior or the interior of the cap.)
- Has work been done on the water system that was not followed by an adequate disinfection when the work was completed? (New pump or pipes installed recently?)
- Is it a new well that has not been in daily use and/or properly disinfected?
- Has the house been vacant and the water system not in use for an extended period of time?
- Is the well properly sealed (cracks in the well casing, etc.)?
- Are there cartridge type or R.O. filters in use on the water system? (These can be a source of bacterial contamination.)
- If the source of the contamination is not due to an ongoing situation, for example, a bad ground water source, then a disinfection of the water system will most likely solve the problem.

## Well Chlorination Explanation

This is a general description of a common procedure used to sterilize well water and water equipment. The purpose of shock disinfection of a well system is to destroy bacterial contamination present in the well system at the time of disinfection and is not intended to kill bacteria that might be introduced at a later time. Therefore it is vital that the well be constructed so that no new contamination may enter the well following completion of the shock disinfection. In order to achieve a satisfactory disinfection of the system, the bacteria must be brought into contact with a chlorine solution of sufficient strength and remain in contact with that solution for sufficient time in order to achieve a complete kill of all bacteria and other microorganisms.

## Caution about Chlorine

When working with chlorine, it should be done in a well-ventilated place. The powder or strong liquid should not

*coli* is present, the sample is subjected to ultraviolet light. If the sample fluoresces, it is considered positive for *E. coli* and therefore does not meet the Safe Drinking Water Act criteria for potable water.

## Assure Proper Sample Procedures

come in contact with skin or clothing. Solutions are best handled in plastic, wood or crockery containers because metals are corroded by strong chlorine solutions.

## Well Chlorination Procedure

If drinking water has been tested and has not passed standards for safe drinking, or any time the building water supply system has been opened for repairs, the well should be disinfected following these procedures, and should be re-tested as described herein. Pour bleach or hypochlorite granules into the well. Some people use swimming pool chlorine tablets which have the advantage that they sink to and sterilize water at the well bottom. The disadvantage is that it takes longer to flush out the chlorine. Health department officials can give more precise guidance about the amount of disinfectant needed based on the depth of the well. Some common guidelines are:

- Well depth 100'- 3 cups bleach or 2 oz. of granules.
- Well depth 200'- 6 cups bleach or 4 oz. of granules.
- Well depth 300'- 9 cups bleach or 6 oz. of granules.
- Well depth 400'- 12 cups bleach or 9 oz. of granules.
- Well depth 500'- 1 gallon bleach or 12 oz. of granules.
- Introduce the chlorine solution into the top of the well. Remove the cap at the upper terminal of the well casing and pour the chlorine solution down the inside of the casing. If the well casing terminates through the floor of a pump house, then the casing is required to have a well seal at the upper terminal [i.e. at the top of the casing]. This well seal can be loosened and the chlorine solution introduced into the well at that point. In a large diameter well [such as a public supply company's well], the chlorine solution should be poured or splashed around the wall of the well so that all inside surfaces of the well are brought into contact with the strong chlorine solution.
- Using a garden hose, spray water down into the well pipe to wash the chlorine solution down to the bottom of the well. Ten gallons of water should be enough. [More won't hurt nor risk running the well dry since you're recycling the well water through the plumbing and back to the well.]

If a result is not satisfactory the following questions must be addressed:

- Turn on all cold water household taps until you can smell the bleach coming out of the faucet farthest from the well.
- Turn off the water and do not use it for 8 to 24 hours (ideally). Seal the top of the well. Do not run laundry with this chlorinated water or it may bleach clothing unexpectedly.
- At the end of the standing period, operate the pump (run the water) until you can no longer smell the bleach. Do not run bleach into the septic system - run water outside through an outside faucet or hose. There should be a hose connection at the bottom of the water tank. When you no longer smell chlorine at the hose draining the water tank, close off the drain and open all faucets in the house to flush out house piping for fifteen minutes or until you no longer smell or taste chlorine [whichever is longer].
- Retest the water after all the bleach or chlorine is out of the system and the water has been used for 5 -7 days (typical health department guideline) or 7-10 days after the disinfection. The longer you wait until the retest, the more valid will be the results.

## If water passes after disinfection

- If the contamination was a relatively low bacteria count and was caused by an unsanitary growth in plumbing equipment this treatment can "correct" the problem.
- If the contamination was a relatively low to modest count and is caused by a persistent source of contamination, this treatment can appear to correct the problem by killing off bacteria. But the problem can recur.
- If the contamination is from a major source, with a high bacteria count, repeated sterilization and testing of the well may yield inconsistent results, sometimes passing, sometimes not.
- "Shocking" a well can temporarily make unacceptable water look fine. If no other corrective measures were taken than to "shock" the well, it is appropriate to follow the first acceptable water test

with a second and perhaps even a third, spaced a week or more apart.

#### **If water fails after disinfection**

If the test still is not satisfactory, it is likely that there is a persistent source of contamination. Common sources of contamination include a loose or damaged cap on buried well casings, loose or damaged pitless adapter (where buried water line enters the well casing), a bad plumbing connection in piping between the well and the building, a dead animal in a well which was not properly capped, and, less common, a cracked or damaged well casing. Poor fitting or damaged well caps can permit insects and other organisms to crawl into the top of the well. As they die and fall into the water, they decompose and may contribute to coliform bacteria. Damaged well casings can involve significant expense to repair or replace.

Since water systems can change, drinking water from private wells should be analyzed on a regular basis. The frequency of testing should be determined by the history of the water quality of the well.

Usually the property owner/seller is responsible for correcting unacceptable water. Check with your attorney and your contract regarding this matter.

Often sellers have the well "shocked" using the sterilization treatment described above. A strong chlorine odor is indicative of a chlorine level which could produce a "false negative" result.

In addition to sterilizing the well, an owner/seller might:

- have an experienced plumber or well service company look for, find, and correct a source of contamination such as a bad plumbing connection at the well (pitless adapter or well casing cap), bad plumbing between well and house (broken or leaky pipe joint), or bad or soiled plumbing components inside the house.
- install water treatment/sterilization equipment such as a chlorinator/charcoal filter system or an ultra-violet light system. These systems work but require maintenance.

Correcting the source of contamination is naturally preferred. But if a home is being sold, often schedule pressures do not permit longer investigation by a plumber to find a problem if it

is not obvious. Therefore, to provide safe potable (drinkable) water immediately, water treatment may be installed. If that course of action is followed, the author still recommends that the new owner/occupants attempt to find and correct the source rather than having to maintain equipment.

---

#### Notice

Every effort has been made to ensure the accuracy and completeness of the information provided herein. However, Analytical Balance Corp., its shareholders, officers, directors and employees cannot be held responsible for errors or omissions or for any consequences arising from the use or misuse of the information provided herein. Accordingly, Analytical Balance Corp., its shareholders, officers, directors and employees assume no responsibility for any injuries suffered, damages or losses incurred as a result of acting upon or failing to act upon the information contained in this pamphlet. All information should be carefully studied and clearly understood before taking any action based on the information or advice presented herein. If you have any questions or concerns about the matters discussed in this pamphlet, please contact Analytical Balance Corp.

Source material used in preparing this pamphlet comes from the United States Environmental Protection Agency, the Commonwealth of Massachusetts, Department of Environmental Protection, Division of Water Supply, the University of Massachusetts, the American Water Works Association, the National Groundwater Association and many other public and private organizations. In particular, an article by Dan Friedman located at the web site: [www.inspect-ny.com/water/badwater.htm](http://www.inspect-ny.com/water/badwater.htm) was used extensively. References to the "author" are to Mr. Friedman. A list of other sources is available upon request.

Research on environmental health and safety issues is ongoing and varying opinions on these and related subjects are held by many different individuals and organizations. Technological advances have provided more sensitive measuring methods so that each year chemicals can be detected at ever lower levels - far below those detectable a decade ago. Trace levels in parts per billion, trillion or quadrillion can now be discovered, but we do not yet know the impact of these low levels on human health.

Every effort has been made to provide the best, most appropriate and complete information available to date. Regulations and technical understanding in these areas change frequently and Analytical Balance Corp. shall not be responsible for keeping this information current in all respects. [3/98]

## **INTERPRETING BACTERIOLOGICAL DRINKING WATER TEST RESULTS AND CORRECTING UNSATISFACTORY WATER**

*Analytical Balance  
Corp.*  
**422 West Grove St.  
Middleboro, MA 02346**

**508-946-2225**

**508-946-3335 (f)**