

## Emergency Disinfection

### Procedures

Procedures for disinfecting a water supply source and distribution system are provided in this section. The following are guidelines when considering an alternate water source to be developed as a source for potable water.

- A. General guidelines when an established acceptable water supply is not available:
  - 1. Ground water is safer than surface sources;
  - 2. In choosing surface waters, stay well above sewage discharges, drainage from refuse piles, dumps, freshly tarred and oiled roads, etc.;
  - 3. Clear water is easier to disinfect than cloudy water;
  - 4. Water may be made safe for drinking by boiling or by adding disinfectant.
  - 5. Water which has been boiled should be chemically disinfected if recontamination is possible during subsequent handling;
  - 6. Between 2 – 4 gallons per day are necessary for each person served;
  - 7. *Improvised toilets should be located so as not to contaminate drinking water source; and*
  - 8. Fire departments, water plants, National Guard armories, or other local services/utilities may have water-pumping equipment available, if needed.
- B. In the event that follow-up samples indicate a consistent safe supply is not obtained, it will be necessary to provide for continuous disinfection.
  - 1. The most common method is a liquid positive-feed chlorinator;
    - a. The chlorinator pump is wired to the well pump, so that chlorine solution is fed into the pressure tank whenever the well pump is activated; and
    - b. The pressure tank needs to provide a minimum 30 minutes retention. This can be accomplished in two ways;
    - c. Determine the gallons per minute for the well pump and multiply this figure by 30 to calculate the minimum size for the pressure tank; or
    - d. Install a flow reducer upstream from the pressure tank to restrict the gallons per minute into the pressure tank to allow for a 30-minute retention.
- C. Ultra-violet light treatment is not accepted as a method of disinfection for the following reasons:
  - 1. There is no residual to counteract subsequent possible contamination in the system.
    - a. Treatment can be greatly diminished due to:
      - (i) Turbidity;
      - (ii) Scale information on the treatment column; and
      - (iii) Age of the u-v-light source.

### Permanent Disinfection of Potable Water Supplies

- 1. The most common method is a liquid positive-feed chlorinator;
  - a. The chlorinator pump is wired to the well pump, so that chlorine solution is fed into the pressure tank whenever the well pump is activated; and
  - b. The pressure tank needs to provide a minimum 30 minutes retention. This can be accomplished in two ways;

- c. Determine the gallons per minute for the well pump and multiply this figure by 30 to calculate the minimum size for the pressure tank; or
  - d. Install a flow reducer upstream from the pressure tank to restrict the gallons per minute into the pressure tank to allow for a 30-minute retention.
  - e. Check for nitrates to ensure levels do not exceed 10 mg/L
2. Ultra-violet light treatment is not accepted as a method of disinfection for the following reasons;
- a. There is no residual to counteract subsequent possible contamination in the system.
  - b. Treatment can be greatly diminished due to;
    - i. Turbidity;
    - ii. Scale formation on the treatment column; and
    - iii. Age of the u-v light source.

### **Disinfecting a Driven or Sandpoint Well**

The outside of a sand point or driven well and all associated equipment should be cleaned following the procedures for drilled wells as much as possible. Then:

1. Pump the well to waste until the water is clear. If possible, avoid pumping water into the pressure tank or the distribution system.
2. Pump water through the distribution system until the water from all of the taps run clear. If the pressure tank or water heaters contain dirty water, drain them first.
3. Turn off the pump and drain the pressure tank. Using a drain plug opening, pressure gage opening outlet pipe, or other opening into the pressure tank, add chlorine bleach or other chlorine into the pressure tank, so that the water in the tank contains approximately 50 ppm free chlorine. This will take approximately 3 (three) tablespoons, or 1 ½ ounces of bleach for each 10 (ten) gallon of tank capacity (a 50-gallon tank, for example, will require approximately ¾ (three fourths) of a cup of bleach.
4. Open all taps one-by-one until chlorinated water comes through each tap. If available, test the water with chlorine test papers. If there is between 10 and 50 ppm chlorine residual go to step 4; if there is less than 10 ppm, add more chlorine to the pressure tank and repeat this step. Let the water stand in the system for at least 4 hours, preferably 12 hours or overnight.
5. After at least 4 hours, flush the system by allowing water to run until the chlorine level is reduced to 5 ppm or less, or until no chlorine taste or odor is detected (if available, use a chlorine test kit).
6. Have the water tested for the presence of bacteria. Continue to disinfect water used for drinking or cooking using the emergency disinfection purposes until a satisfactory bacteriological test result is received. If the test results are unsatisfactory, repeat the disinfection process. The water should be tested again for bacteria after 2 weeks.

### **Disinfecting Drinking Water**

The following guidelines are recommendations from the Department of Health and Senior Services. Other agencies may have different recommendations for water disinfection but the department believes these to be workable and the most effective and safe for the public.

Private water supplies will become contaminated if any open part of the system has become submerged due to flooding, including but not limited to, a well cistern head or any faucet end in the piping system. Flood waters are contaminated due to the tremendous number of contaminants dissolved in the waters such as livestock manure, washed out septic systems and flooded municipal sewage treatment plants.

Water to be used for drinking, cooking making any prepared drink, or brushing teeth should be properly disinfected.

All water possibly contaminated by flooding must be disinfected, whether from wells or cisterns.

Drinking water may be treated by one of the following methods:

- Boil water for three (3) minutes in a clean container. The flat taste can be eliminated by shaking the water in a bottle or by pouring it from one container to another.
- Mix one eighth (1/8) teaspoon of liquid, unscented chlorine laundry bleach, with one (1) gallon of water, and let stand for at least thirty (30) minutes before drinking. Larger quantities of water (10 gallons at a time) may be sterilized with common household bleach (having 4 to 6 percent available chlorine) by using only 2 (two) teaspoons of bleach in clear water. It is important to allow any turbid or dirty water to settle before sterilization is attempted. Pour the clear water in a clean container containing the bleach. Allow the water to stand for 1 (one) hour before using.

### **Tincture of Iodine**

Common household iodine from the medicine chest or first aid package may be used to disinfect water. Add five drops of 2 (two) percent United States Pharmacopoeia (U.S.P) tincture of iodine to each quart of clear water. For turbid water, add 10 (ten) drops and let the solution stand for at least 30 minutes.