

## **WATER PURIFICATION**

- 1) Clear water is a sign of pure water. Always drain long-standing pipes for 30 seconds to one minute before drinking! (Cheap remote motels?)
- 2) 1 Gallon water is disinfected by 8-16 drops of regular household bleach (visually about 1/4 of a teaspoon) - double that for cloudy water. Shake and let stand 30 minutes. One teaspoon will disinfect 5 gallons. Immediately after treating, water must initially have a slight smell of chlorine. If it does not - repeat the process.
- 3) Household bleach is relatively harmless. The smell or "waft" of chlorine is not bad: it indicates that water is treated and germ free. Once treated and disinfected, the chlorine smell will go away in a few days.
- 4) Regularly used water from large tanks may be treated once or twice a month with 1 Oz. bleach per 200 gallons or 5 Oz. bleach per 1000 gallons.
- 5) Long-standing water in tanks will be disinfected w/ 1 pint household bleach per 1000 gallons. (2500 gal tanks are fine with 3 pints.)
- 6) Bleach effectively kills bacteria and viruses, stops smells and then breaks down. Its effective germ killing alkaline property is completely neutralized very quickly. It does not stay chemically active in tanks for more than a few days. Most germs require sunlight to grow. Store water in the dark.
- 7) If water is relatively clear: but has a noticeable smell of chlorine: it is drinkable, disinfected, and harmless. Humans need 2 quarts per day.

## **Comments**

The above text is designed to be printed, cut-out, and taped inside a cabinet door, or saved as a reminder.

6 % sodium hypochlorite solution, referred to as "common household chlorine bleach", is not a seriously poisonous substance to humans. It is an alkaline salt. It is not an "acid". However it very, very effectively kills bacteria and viruses upon contact. It is the world-wide chemical of choice for treating drinking water, or for effectively sterilizing everything from shower stalls to surgical instruments. Truthfully, very heavily chlorinated water may be more irritating to the lungs - if it

is used for showers, than it is harmful to the intestinal tract if used for drinking purposes. Even drinking straight household bleach rarely results in death. The alkaline properties of undiluted bleach may cause painful chemical burns to the esophagus and stomach - but it is not deadly poisonous. Bleach must always be kept out of the reach of children - because not only might they drink it - they may get it in their eyes.

All long-standing water that is exposed to air and sunlight grows bacteria and other organisms which may include the very troublesome protozoa, Giardia. These organisms may cause people to become very sick. Iodine has long been carried by back-packers for cases of emergency because very small long-lasting tablets effectively disinfect germ infected water. Iodine is at least 1000 times more toxic than is sodium hypochlorite (bleach). Unlike sodium hypochlorite, iodine does not break down. It does, however, cause an unpleasant taste in treated water. This is why back packers are given the option to carry a taste neutralizing tablet for use if water has been treated with iodine. Iodine does remain in the body. Iodine poisoning is of greater concern for longer term situations than is the slight smell of bleach. In any regular situation, bleach is the **by far** the preferred method for purifying drinking water because it effectively kills harmful organisms, and then it breaks down and is quickly chemically neutralized.

It should be noted that fish, mosquitoes, algae, etc. can not - and do not live - in poisonous water. Given the choice between two still ponds in the wild: one with mosquitos, or algae growing in it -- and another near-by it, which may be seemingly clear - I would prefer to drink the water that has the organic life growing in it. The other standing water, even though it appears clear - is obviously unusable or undesirable to other living organisms and therefore it may be poisonous.

New well-water should ALWAYS be tested by the drilling company to determine if the water coming from the ground is truly safe for drinking. Ground water can be unsuitable for a number of reasons, but in general it is very good water.

Without any doubt, the easiest way to insure clean, safe, pure drinking water, is to instal a water purification system that acts both as a filter, and a purifier. These are the common water purification systems available everywhere. They filter particles and purify the water from bacteria, viruses and other harmful chemicals. An EXCELLENT portable water purification device can be purchased for emergency use for under \$70.00. Home water purification systems, even purifiers that attach directly to the water tap - are absolutely excellent! This is the best way to actually insure that the water you are drinking is clean and pure. These systems, which act both as filters, and purifiers - are the systems of choice for any rational person. It is nice to know the ratio's of bleach necessary for disinfecting water if one fears that water may be contaminated - but this is intended for people who use large water tanks, or to be guide-lines for serious

emergency situations. For normal living, modern water purification systems are definitely the methods of choice for eliminating bacteria, viruses, smells, and other undesirable substances.