

Water precautions during a wide scale emergency by KI5UAJ

In 2014, a chemical plant near Charleston, West Virginia spilled chemicals into the Elk River and contaminated the municipal water for 300,000 people. Citizens were advised not to drink, bathe with or use this water for anything except flushing toilets. The water was contaminated for weeks. This is an example of the vulnerability of municipal water supplies. Although chemical spills contaminating water supplies are fairly rare, biological contamination is a much more frequent issue. Automatic municipal water treatment systems do sometimes fail resulting in mandates to boil municipal water before use. Also during wide spread disasters, water plants may lose power and that could cut off the drinking water supply.

A few days ago, authorities in Southern California were racing to figure out how to prevent the explosion of a storage tank that has been leaking a hazardous chemical used to make plastic parts, as some 40,000 people were under evacuation orders in the area.

A storage tank holding between 6,000 and 7,000 gallons (22,700 and 26,500 liters) of methyl methacrylate overheated and began venting vapors into the air at an aerospace plastics facility in Garden Grove, a city in Orange County.

The tank could fail and crack, releasing the chemical onto the ground, or it could explode.

The Red Cross, FEMA and other sources recommend that we have an emergency water supply of at least 3 days – that would be one gallon per person per day. The actual amount of water we need varies depending on the outside temperature, the humidity and our activity level. During hot weather and when our level of activity is high, the human body may require up to two gallons of water per day to avoid dehydration. Bottled water is the usual choice for ensuring that you and your family have an emergency drinking water supply.

It is estimated that the average American uses about 50 gallons of water per day. This includes not only water for food preparation and drinking but all other uses including showering, laundry, flushing the toilet, etc. During an emergency, if our

municipal water is cut off then we are obviously going to have to make do with much less! During extended water outages we may be forced to collect water from nontraditional sources such as rivers, streams, ponds, rain water, etc. Water taken from these alternate sources will require treatment to make it safe for human consumption.

Common Categories & Levels of Notices

- **Precautionary Boil Water Advisory:** Issued when the water system experiences a loss of positive pressure (typically dropping below 20 psi), a major water main break, or a power outage at treatment plants. This is used as a temporary safeguard until water samples are collected and cleared.
- **Mandatory Boil Water Notice:** Issued when testing confirms the presence of waterborne pathogens or extreme turbidity (cloudiness), meaning the water is highly susceptible to biological contamination.
- **Do Not Drink / Do Not Use Order:** The most severe level. Issued when the water is contaminated with chemical spills, toxins, or radiological hazards. Under this order, boiling the water will *not* make it safe, and you must use commercially bottled water for all contact, drinking, and cooking.

There are Four basic ways to purify water:

- Mechanical Filtration
- Heat Sterilization
- Chemical Treatment
- UV Treatment

For some situations you may choose to use a combination of these methods.

Mechanical Filtration involves running your water through some type of filter to trap particulate matter and/or remove biological contaminants. The most popular types of mechanical filters that will produce clean drinking water are made for the outdoor recreation market. Ceramic and Membrane filters are the most popular models available today. Ceramic or membrane filters have openings (sometimes called pores) small enough to allow water through but will trap contaminants such as dust, dirt, bacteria and parasites. They will not protect against viruses.

There are several styles of ceramic and membrane filters – Pump filters and Gravity

filters. Pump filters require the user to pump the water through the filter using a pump handle on the filter body. Gravity filters use gravity to pull water through the filter.

Other less effective methods of mechanical filtration include simple cloth or paper filters that will remove large contaminants such as dust, dirt, algae and other sediment. Cloth or paper filters will not make water safe to drink without additional chemical or heat treatment to kill bacteria and viruses.

Heat Sterilization involves boiling your water and allowing it to boil for at least 10 minutes. The 10 minute boil will kill all bacteria, protozoa and **viruses** making it safe to drink. Boiling alone does not remove dust or dirt from the water nor does it remove chemical contaminants – it concentrates them! Pre-filtering the water with a simple mechanical filter before boiling it will remove much of this debris. A popular way to pre-filter water before boiling is to run the water through a coffee filter or T-shirt.

Chemical Treatment involves adding chlorine or iodine to water then mixing it and allowing it to stand for 30 to 60 minutes before use. Many different brands of water purification tablets are available on the market. These tablets are effective in killing bacteria, protozoa and **viruses** making the water safe to drink. Most camping and sporting goods stores carry these tablets and they are available online. Note that the iodine tablets have a taste that many people dislike.

Unscented chlorine bleach may be used to treat water and the proper amount to use is between 8-16 drops per gallon then stir it and let it sit for 30 minutes before use. If the water does not smell slightly of Chlorine, the treatment should be repeated. None of these chemical treatments will remove dust, dirt or other sediment from your water. Pre-filtering the water will remove most of those contaminants.

UV Treatment involves subjecting the water to intense ultraviolet light. This method is one I have never tried. Ultraviolet light will kill bacteria, protozoa and **viruses** making the water safe to drink. There are several UV water treatment devices on the market today. They are primarily marketed to the camping and hiking community. The one drawback in using UV water treatment is that all of these units run on batteries so when you run out of batteries then the unit is

useless. **Sunlight** will accomplish the same thing but required exposure is longer and dirty or cloudy water inhibits the process...filter first.

Regardless of which type of water treatment you choose to use, you should try to collect the cleanest water available. Large quantities of debris or dirt in the water will make all of the purification methods less effective and will significantly reduce the life of mechanical filters. I personally use a wide mouth Nalgene bottle that I have coffee filters for when I am gathering my from a questionable source. I then proceed with other methods like a life straw or sawyer filter.

Beware that none of the methods of water purification presented here will remove **chemical contamination**. Water contaminated with industrial chemicals, gasoline or oil is always unfit for human consumption and should be avoided.

That concludes tonight's training.

Thanks, this is KI5UAI returning to net control.

Send corrections, modifications, updates or suggestions to k5prs@aol.com