

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WSG 61

Date Signed: August 6, 1990

**Revised:** July 28, 1997

**Revised by:** Marc Parotta

MEMORANDUM

SUBJECT: Use of Water Treatment Chemicals and Operation of  
Public Water Systems During Emergencies

FROM: Michael B. Cook, Director (signed by Michael B. Cook)  
Office of Drinking Water (WH-550D)

TO: Water Supply Branch Chiefs  
Regions I - X

This memorandum clarifies EPA's guidance on water treatment chemicals and the operation of public water supplies during emergencies. Specifically, this guidance addresses emergency disinfection. Since the Public Water System Supervision Policy Directive Manual is currently being revamped, I will postpone assigning a number to this guidance document and will incorporate it into the revised Policy Directive Manual.

Water Treatment Chemicals

States have the authority to control (approve, prohibit, or limit) the use of water treatment chemicals in public water supplies. We recommend (and nearly all States agree) that direct additives used in public supplies meet the specifications of National Sanitation Foundation (NSF) Standard 60. I further recommend that States use NSF Standard 60, in administering their domestic water supply programs. In all cases, systems must comply with Federal laws and regulations, including the Safe Drinking Water Act; Federal Insecticide, Fungicide, and Rodenticide Act; and the Federal Food, Drug and Cosmetic Act.

Operation of Public Water Supplies during Emergencies

Water supply is essential, but only properly disinfected water may be consumed. In an emergency, when the provision of adequately disinfected water is interrupted, a public water supply should contact the State immediately for guidance. As an interim emergency measure, while awaiting State response, we suggest that the system provide the information on emergency disinfection in EPA Manual of Individual Water Supply Systems, Appendix C, as guidance to its customers.

I ask that you distribute copies of this guidance (attached) to the States and other interested parties.

Attachment

**Manual of Individual Water Supply Systems**

Appendix C  
*Emergency Disinfection*

When ground water is not available and surface water must be used, avoid sources containing floating material or water with a dark color or an odor. The water tank from a surface source should be taken from a point upstream from any inhabited area and dipped, if possible, from below the surface.

When the home water supply system is interrupted by natural or other forms of disaster, limited amounts of water may be obtained by draining the hot water tank or melting ice cubes.

In case of a nuclear attack, surface water should not be used for domestic purposes unless it is first found to be free from excessive radioactive fallout. The usual emergency treatment procedures do not remove such substances. Competent radiological monitoring services as may be available in local areas should be relied upon for this information.

There are two general methods by which small quantities of water can be effectively disinfected. One method is by boiling. It is the most positive method by which water can be made bacterially safe to drink. Another method is chemical treatment. If applied with care, certain chemicals will make most waters free of harmful or pathogenic organisms.

When emergency disinfection is necessary, the physical condition of the water must be considered. The degree of disinfection will be reduced in water that is turbid. Turbid or colored water should be filtered through clean cloths or allowed to settle, and the clean water drawn off before disinfection. Water prepared for disinfection should be stored only in clean, tightly covered, noncorrodible containers.

**METHODS OF EMERGENCY DISINFECTION**

1. *Boiling.* Vigorous boiling for 1 full minute will kill any disease-causing bacteria present in water. The flat taste of boiled water can be improved by pouring it back and forth from one container into another, by allowing it to stand for a few hours, or by adding a small pinch of salt for each quart of water boiled.

2. *Chemical Treatment.* When boiling is not

practical, chemical disinfection should be used. The two chemicals commonly used are chlorine and iodine.

a. *Chlorine*

(1) *Chlorine Bleach.* Common household bleach contains a chlorine compound that will disinfect water. The procedure to be followed is usually written on the label. When the necessary procedure is not given, one should find the percentage of available chlorine on the label and use the information in the following tabulation as a guide:

Available chlorine <sup>1</sup>	Drops per quart of clear water <sup>2</sup>	Appr. Conc. as available free chlorine
1%	10	5 ppm
4-6%	2	4-6 ppm
7-10%	1	4-5 ppm

<sup>1</sup>If strength is unknown, add 10 drops per quart to purify.

<sup>2</sup>Double amount for turbid or colored water.

The treated water should be mixed thoroughly and allowed to stand for 30 minutes. The water should have a slight chlorine odor; if not, repeat the dosage and allow the water to stand for an additional 15 minutes. If the treated water has too strong a chlorine taste, it can be made more palatable by allowing the water to stand exposed to the air for a few hours or by pouring it from one clean container to another several times.

(2) *Granular Calcium Hypochlorite.* Add and dissolve one heaping teaspoon of high-test granular calcium hypochlorite (approximately 1/4 ounce) for each 2 gallons of water. This mixture will produce a stock chlorine solution of approximately 500 mg/l, since the calcium hypochlorite has an available chlorine equal to 70 percent of its weight. To disinfect water, add the chlorine solution in the ratio of one part of chlorine solution to each 100 parts of water to be treated. This is roughly equal to adding 1 pint (16 oz.) of stock chlorine solution to each 12.5 gallons of water to be disinfected. To remove any objectionable chlorine odor, aerate the water as described above.

(3) *Chlorine Tablets.* Chlorine tablets containing the necessary dosage for drinking water disinfection can be purchased in a commercially prepared form. These tablets are available from drug and sporting goods stores and should be used as stated in the instructions. When instructions are not available, use one tablet for each quart of water to be

purified.

b. *Iodine*

(1) *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 percent United States Pharmacopeia (U.S.P.) tincture of iodine to each quart of clear water. For turbid water add 10 drops and let the solution stand for at least 30 minutes (appr. 5 ppm).

(2) *Iodine Tablets*. Commercially prepared iodine tablets containing the necessary dosage for drinking water disinfection can be purchased at drug and sporting goods stores. They should be used as stated in the instructions. When instructions are not available, use one tablet for each quart of water to be purified.

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