

# ***FOOD SAFETY IN DISASTER ENVIRONMENTS***

## **I. Keeping Food Safe During an Emergency**

**Always** keep meat, poultry, fish, and eggs refrigerated at or below 40 °F and frozen food at or below 0 °F. This may be difficult when the power is out.

Keep the refrigerator and freezer doors closed as much as possible to maintain the cold temperature. The refrigerator will keep food safely cold for about 4 hours if it is unopened. A full freezer will hold the temperature for approximately 48 hours (24 hours if it is half full) if the door remains closed. Obtain dry or block ice to keep your refrigerator as cold as possible if the power is going to be out for a prolonged period of time. Fifty pounds of dry ice should hold an 18-cubic foot full freezer for 2 days. Plan ahead and know where dry ice and block ice can be purchased.

**Be** prepared for an emergency by having items on hand that don't require refrigeration and can be eaten cold or heated on the outdoor grill. Shelf-stable food, boxed or canned milk, water, and canned goods should be part of a planned emergency food supply. Make sure you have ready-to-use baby formula for infants and pet food. Remember to use these items and replace them from time to time. Be sure to keep a hand-held can opener for an emergency.

**Consider** what you can do ahead of time to store your food safely in an emergency. If you live in a location that could be affected by a flood, plan your food storage on shelves that will be safely out of the way of contaminated water. Coolers are a great help for keeping food cold if the power will be out for more than 4 hours—have a couple on hand along with frozen gel packs. When your freezer is not full, keep items close together—this helps the food stay cold longer.

**Digital**, dial, or instant-read food thermometers and appliance thermometers will help you know if the food is at safe temperatures. Keep appliance thermometers in the refrigerator and freezer at all times. When the power is out, an appliance thermometer will always indicate the temperature in the refrigerator and freezer no matter how long the power has been out. The refrigerator temperature should be 40 °F or below; the freezer, 0 °F or lower. If you're not sure a particular food is cold enough, take its temperature with a food thermometer.

## **II. Safe Eating and Drinking After a Disaster**

### **General Guidelines:**

- Consider all water from wells, cisterns and other delivery systems in the disaster area unsafe until tested.
- Check if the water supply was disrupted or contaminated.
- Drink only approved or chlorinated water.
- Check foods and discard any containing particles of glass or slivers of other debris.

- Discard canned foods with broken seams, dents, leaks, etc.
- Be alert for gas line leaks. If you smell gas, do not try to cook. Open all windows and doors, turn off the main gas valve at the meter and leave the house immediately.

### **Flood-Contaminated Foods**

Floods may carry silt, raw sewage, oil or chemical wastes. Filth and disease-causing bacteria in floodwater will contaminate food, making it unsafe to eat.

Use the following guidelines when deciding which foods to discard and which to save:

#### **Food To Discard**

1. Opened containers and packages which have come in contact with floodwaters.
2. Unopened jars and bottles.
3. Containers of spices, seasonings and flavorings.
4. Flour, grains, rice sugar and coffee in canisters or bags.
5. Paper, cloth, fiber or cardboard boxes, even if the contents seem dry. This includes salt, cereals, pasta products, rice and any “sealed” packages of crackers, cookies or mixes within a larger paper box.
6. Commercially-canned foods that are dented, bulging, rusty or leaking. Cans which have been tossed about and are found far from their normal storage spot. Seams on these cans may have been weakened or their seals broken, causing contamination or spoilage.
7. Jam or jelly sealed with paraffin.
8. Containers with non-sealed, fitted lids, such as cocoa or baking powder.
9. Commercially-bottled carbonated beverages. If the cap is crusted with silt, don’t attempt to wash since pressure in bottles may cause an explosion.
10. Foil or cellophane packages.
11. All fresh fruits and vegetables.
12. Fresh meat, fish and poultry which have been in contact with floodwaters.
13. Home-canned foods.
14. Foods in containers with pull-tops, corks or screw caps.
15. All foods that were covered by water which may have been contaminated with industrial waste, even those foods sealed in unopened cans.
16. If floodwater has entered your freezer or refrigerator, dispose of all foods not sealed in metal cans.

Discard wooden cutting boards, plastic utensils, baby bottle nipples, and pacifiers. There is no way to safely clean them if they have come in contact with contaminated flood waters.

Thoroughly wash metal pans, ceramic dishes, and utensils with hot soapy water and sanitize by boiling them in clean water or by immersing them for 15 minutes in a solution of 1 teaspoon of chlorine bleach per quart of water.

## **Foods To Save**

Commercially-canned foods are usually safe after being in flood waters if the metal can appears undamaged. But discard cans if they are rusty, creased, dented, crushed, bulging or have ends that spring in and out. The contents may be contaminated. **DO NOT TASTE.**

All cans must be washed and sanitized before they are opened.

### **To disinfect cans:**

1. Remove labels. (They harbor bacteria.) Wash cans in strong detergent solution with scrub brush. Remove all silt.
2. Immerse scrubbed containers for 15 minutes in cold (60-70° F) chlorine solution. Household bleaches contain from 2% to 6% chlorine. The amount of bleach to add to water depends on the percent chlorine it contains:

<i>% chlorine in bleach</i>	<i>Volume of bleach to add to 1 qt. of water</i>	<i>Volume of bleach to add to 1 gallon of water</i>
2%	2 teaspoons	2 tablespoons
4%	1 teaspoon	1 tablespoon
6%	½ teaspoon	½ tablespoon

3. Remove containers from solution and air-dry before opening.

For additional safety, thoroughly cook the canned food before eating it.

See Appendix A for further guidelines on saving and discarding foods.

## **III. WATER**

**After a natural disaster, consider all water from wells, cisterns and other delivery systems in the delivery area unsafe until tested.**

In an emergency situation it is best to use **bottled water** if at all possible.

BOILING water during a natural disaster is sometimes more harmful than helpful. Boiling the water may concentrate unwanted chemicals from nitrates and pesticides. **Boiling water should only be considered a safe way of purifying water once a BOIL ORDER has been announced.**

### Hidden Water Sources in Your Home:

If a disaster catches you without a big enough stored supply of clean water, you can use the water in your hot-water tank, pipes, and ice cubes. As a last resort, you can use water in the reservoir tank of your toilet (not the bowl).

Do you know the location of your incoming water valve? You'll need to shut it off to stop contaminated water from entering your home if you hear reports of broken water or sewage lines, or a failure at the water treatment plant.

To use the water in your pipes, shut off the incoming water valve. Let air into the plumbing by turning on the faucet in your house at the highest level. A small amount of water will trickle out. Then obtain water from the lowest faucet in the house.

To use the water in your hot-water tank, be sure that plumbing fixtures and the water heater are not submerged by flood. Turn the electricity or gas off, and turn off the water intake valve. Start the water flowing by opening the drain at the bottom of the tank and turning on a hot-water faucet. Do not turn on the gas or electricity when the tank is empty.

Waterbeds hold up to 400 gallons of water, but some water beds contain toxic chemicals that are not fully removed by purifiers. If used as an emergency water resource, drain it yearly and refill it with fresh water containing two (2) ounces (1/4 cup) of bleach per 120 gallons of water. Do not add algicides or other additives (with the exception of chlorine bleach) if this water is to be used as a water reserve. Before use, water should be boiled.

### Other Sources of Water

If you need to find water outside your home, the only sources may contain harmful bacteria. Be sure to purify the water according to the instructions listed below before drinking it.

Some possible sources are: collected rainwater; streams, rivers and other moving bodies of water; ponds and lakes; and natural springs. Avoid water with floating material, an odor or dark color. Use saltwater only if you distill it first. *You should not drink floodwater.*

### Three Ways to Purify Water:

In addition to having a bad odor and taste, contaminated water can contain microorganisms that cause diseases such as dysentery, typhoid and hepatitis. You should purify all water of uncertain purity before using it for drinking, food preparation or hygiene.

There are many ways to purify water. None is perfect. Often the best solution is a combination of methods. Two easy purification methods are outlined below. These measures will kill most microbes but will not remove other contaminants such as heavy metals, salts and most other chemicals. Before purifying, let any suspended particles settle to the bottom, or strain them through layers of paper towel, coffee filter, or clean cloth.

**1. Boiling** – Boiling is the safest method of purifying water. Bring water to a rolling boil for 3-5 minutes, keeping in mind that some water will evaporate. Let the water cool before drinking.

Boiled water will taste better if you put oxygen back into it by pouring the water back and forth between two clean containers. This will also improve the taste of stored water.

**2. Disinfection** – You can use household liquid bleach to kill microorganisms. Use only regular household liquid bleach that contains 5.25 percent sodium hypochlorite. Do not use scented bleaches, color-safe bleaches, or bleaches with added cleaners.

Add 16 drops of bleach per gallon of water, stir and let stand for 30 minutes. If the water does not have a slight bleach odor, repeat the dosage and let stand another 15 minutes.

The only agent used to purify water should be household liquid bleach. Iodine, water treatment products sold in camping or surplus stores, and other chemicals that do not contain 5.25 percent sodium hypochlorite as the only active ingredient, are not recommended and should not be used.

While the two methods described above will kill most microbes in water, distillation will remove microbes that resist these methods, and heavy metals, salts and most other chemicals.

**3. Distillation** – Distillation involves boiling water and then collecting the vapor that condenses back to water. The condensed vapor will not include salt and other impurities. To distill, use a clean pot with a lid that has a knob-type handle in the center. Fill the pot halfway with water. Turn the pot's lid upside-down and tie a cup under the handle, so that the cup will hang right-side-up (make sure the cup is not dangling into the water) and boil the water for 20 minutes. The water that drips from the lid into the cup is distilled.

### **Cooking When the Power Is Out:**

- Charcoal or gas grills are the most obvious alternative sources of heat for cooking. **NEVER USE THEM INDOORS.** In doing so you risk both asphyxiation from carbon monoxide and the chance of starting a fire that could destroy your home.
- Likewise, camp stoves that use gasoline or solid fuel should always be used outdoors.
- Small electrical appliances can be used to prepare meals if you have access to an electrical generator.
- Wood can be used for cooking in many situations. You can cook in a fireplace if the chimney is sound. Don't start a fire in a fireplace that has a broken chimney. Be sure the damper is open.
- If you're cooking on a wood stove, make sure the stove pipe has not been damaged.
- If you have to build a fire outside, build it away from buildings, never in a carport. Sparks can easily get into the ceiling and start a house fire.
- Never use gasoline to get a wood or charcoal fire started.
- Make sure any fire is well-contained. A metal drum or stones around the fire bed are good precautions. A charcoal grill is a good place in which to build a wood fire. Be sure to put out any fire when you are through with it.
- When cooking is not possible, many canned foods can be eaten cold.

## REFERENCES

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## Refrigerated Foods

<b>When to Save and When to Throw It Out</b>	
<b>FOOD</b>	<b>Held above 40 °F for over 2 hours</b>
<b>MEAT, POULTRY, SEAFOOD</b> Raw or leftover cooked meat, poultry, fish, or seafood; soy meat substitutes	Discard
Thawing meat or poultry	Discard
Meat, tuna, shrimp, chicken, or egg salad	Discard
Gravy, stuffing, broth	Discard
Lunchmeats, hot dogs, bacon, sausage, dried beef	Discard
Pizza – with any topping	Discard
Canned hams labeled "Keep Refrigerated"	Discard
Canned meats and fish, opened	Discard
<b>CHEESE</b> Soft Cheeses: blue/bleu, Roquefort, Brie, Camembert, cottage, cream, Edam, Monterey Jack, ricotta, mozzarella, Muenster, Neufchatel, Queso blanco fresco	Discard
Hard Cheeses: Cheddar, Colby, Swiss, Parmesan, provolone, Romano	Safe
Processed Cheeses	Safe
Shredded Cheeses	Discard

Low-fat Cheeses	Discard
Grated Parmesan, Romano, or combination (in can or jar)	Safe
<b>DAIRY</b> Milk, cream, sour cream, buttermilk, evaporated milk, yogurt, eggnog, soy milk	Discard
Butter, margarine	Safe
Baby formula, opened	Discard
<b>EGGS</b> Fresh eggs, hard-cooked in shell, egg dishes, egg products	Discard
Custards and puddings	Discard
<b>CASSEROLES, SOUPS, STEWS</b>	Discard
<b>FRUITS</b> Fresh fruits, cut	Discard
Fruit juices, opened	Safe
Canned fruits, opened	Safe
Fresh fruits, coconut, raisins, dried fruits, candied fruits, dates	Safe
<b>SAUCES, SPREADS, JAMS</b> Opened mayonnaise, tartar sauce, horseradish	Discard if above 50 °F for over 8 hrs.
Peanut butter	Safe
Jelly, relish, taco sauce, mustard, catsup, olives, pickles	Safe
Worcestershire, soy, barbecue, Hoisin sauces	Safe
Fish sauces (oyster sauce)	Discard
Opened vinegar-based dressings	Safe
Opened creamy-based dressings	Discard



Spaghetti sauce, opened jar	Discard
<b>BREAD, CAKES, COOKIES,PASTA, GRAINS</b> Bread, rolls, cakes, muffins, quick breads, tortillas	Safe
Refrigerator biscuits, rolls, cookie dough	Discard
Cooked pasta, rice, potatoes	Discard
Pasta salads with mayonnaise or vinaigrette	Discard
Fresh pasta	Discard
Cheesecake	Discard
Breakfast foods –waffles, pancakes, bagels	Safe
<b>PIES, PASTRY</b> Pastries, cream filled	Discard
Pies – custard, cheese filled, or chiffon; quiche	Discard
Pies, fruit	Safe
<b>VEGETABLES</b> Fresh mushrooms, herbs, spices	Safe
Greens, pre-cut, pre-washed, packaged	Discard
Vegetables, raw	Safe
Vegetables, cooked; tofu	Discard
Vegetable juice, opened	Discard
Baked potatoes	Discard
Commercial garlic in oil	Discard
Potato Salad	Discard

## Frozen Foods

When to Save and When To Throw It Out		
FOOD	Still contains ice crystals and feels as cold as if refrigerated	Thawed. Held above 40 °F for over 2 hours
<b>MEAT, POULTRY, SEAFOOD</b> Beef, veal, lamb, pork, and ground meats	Refreeze	Discard
Poultry and ground poultry	Refreeze	Discard
Variety meats (liver, kidney, heart, chitterlings)	Refreeze	Discard
Casseroles, stews, soups	Refreeze	Discard
Fish, shellfish, breaded seafood products	Refreeze. However, there will be some texture and flavor loss.	Discard
<b>DAIRY</b> Milk	Refreeze. May lose some texture.	Discard
Eggs (out of shell) and egg products	Refreeze	Discard
Ice cream, frozen yogurt	Discard	Discard

Cheese (soft and semi-soft)	Refreeze. May lose some texture.	Discard
Hard cheeses	Refreeze	Refreeze
Shredded cheeses	Refreeze	Discard
Casseroles containing milk, cream, eggs, soft cheeses	Refreeze	Discard
Cheesecake	Refreeze	Discard
<b>FRUITS</b> Juices	Refreeze	Refreeze. Discard if mold, yeasty smell, or sliminess develops.
Home or commercially packaged	Refreeze. Will change texture and flavor.	Refreeze. Discard if mold, yeasty smell, or sliminess develops.
<b>VEGETABLES</b> Juices	Refreeze	Discard after held above 40 °F for 6 hours.
Home or commercially packaged or blanched	Refreeze. May suffer texture and flavor loss.	Discard after held above 40 °F for 6 hours.
<b>BREADS, PASTRIES</b> Breads, rolls, muffins, cakes (without custard)	Refreeze	Refreeze

fillings)		
Cakes, pies, pastries with custard or cheese filling	Refreeze	Discard
Pie crusts, commercial and homemade bread dough	Refreeze. Some quality loss may occur.	Refreeze. Quality loss is considerable.
<b>OTHER</b> Casseroles – pasta, rice based	Refreeze	Discard
Flour, cornmeal, nuts	Refreeze	Refreeze
Breakfast items –waffles, pancakes, bagels	Refreeze	Refreeze
Frozen meal, entree, specialty items (pizza, sausage and biscuit, meat pie, convenience foods)	Refreeze	Discard