

INDIANA STATE DEPARTMENT OF HEALTH
Sanitary Engineering
2 North Meridian Section 5E
Indianapolis, Indiana 46204
AC 317/233-7811

FLOOD OR DISASTER SANITATION INFORMATION

The attached information will be of assistance to homeowners and citizens both during and after a flood or other disaster which effects private residences, water supplies, and other facilities. The following information is intended as a quick guide to frequently asked questions and concerns. Detailed information may be obtained at the local health department or the Indiana State Department of Health.

The following information should provide guidance in dealing with disaster related issues:

1. Directions for Treating Water in Small Quantities. - These instructions should be followed if a safe water source is not immediately available.
2. Directions for Disinfecting Wells and Water Sources. - This information is necessary for the proper sanitizing of wells or other private water sources after the flooding has subsided, and before the supply is again put to use.
3. Salvaging Flood Damaged Food in the Home. - Information and direction relating to foods and food containers that may be safely salvaged.
4. Rehabilitation of Buildings, Furnaces, Furniture, Rugs, and Clothing. Information to assist homeowners and others in salvaging household items and rehabilitating the structure for occupancy following the disaster.

Feel free to contact the Indiana State Department of Health or your local health department for additional information.

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DIRECTIONS FOR TREATING DRINKING WATER IN SMALL QUANTITIES

1. In emergencies, or as a temporary measure, water from contaminated or suspect sources can be disinfected by either chlorination or boiling.
 - a. Secure safe drinking water from an approved or emergency source if possible. If not possible, treat all water before drinking.
 - b. If tap water is not clear, it should not be used. If a less turbid water source cannot be located, allow the water to stand in a container until the sediment settles and pour off (decant) the clear water into a clean vessel.
2. **Chlorination** - Add six (6) drops of a liquid chlorine laundry bleach to one gallon of water and mix. Chlorine bleaches are inexpensive and can be secured from most grocery, discount, or drug stores.
 - a. Wait thirty (30) minutes after adding the chlorine before using the water for drinking or cooking purposes.
 - b. If this treatment does not give the water a taste of chlorine, the above quantities should be doubled. Repeat the addition of chlorine until a slight taste of chlorine is present and use this amount for future treatments.
 - c. The taste of chlorine is not particularly unpleasant and it will be evidence that the water is safe to drink.
3. **Boiling** -The water may also be purified by boiling. In this method, bring the water to a full boil for at least five (5) minutes. Cool and aerate the boiled water by pouring it through the air from one clean container to another, or mixing rapidly with a clean utensil. Aeration will reduce the flat taste cause by boiling.
4. One of the above treatments should be continued until water of unquestioned quality can be secured. Remember that the safety of water cannot be judged by color, odor, or taste. The organisms that cause water-borne disease cannot be seen.
5. Contact your local health department or Sanitary Engineering for assistance or advice.

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DIRECTIONS FOR DISINFECTING WELLS AND WATER SOURCES

The following instructions are for the disinfection or treatment of wells and private water sources which have been subjected to flood, storm water, or other possible sources of contamination. **If the well casing is submerged in flood water, DO NOT USE THE WATER.** Water from submerged wells can not be safely sanitized. When flood waters recede, small quantities may be disinfected until the well can be properly chlorinated. (See Directions for Treating Small Quantities of Drinking Water.)

After flood waters recede, or the cause of contamination is eliminated, wells can be disinfected with chlorine. A convenient form to use is sold commercially in grocery or other stores as a liquid chlorine laundry bleach. Most of these products contain 5.25 percent solution or more of sodium hypochlorite when fresh, and is equivalent to 5 percent available chlorine.

1. Determine the Amount and Add the Chlorine Disinfecting Solution.

The quantity of chlorine solution needed to disinfect a well is based upon 100 parts of chlorine to a million parts of water. To eliminate mathematical calculations, it is safe to use the following quantities and methods to disinfect the different types, sizes, and depths of wells and water sources:

- A. **Drilled or Driven Wells** - Use one quart of the commercial 5 percent chlorine solution for each 100 feet of well depth in a drilled well which is four inches in diameter. For two-inch driven wells, or smaller, add one cup for each 25 feet of water.
1. The measured solution should be diluted with water to make about three (3) gallons. Water drawn from the contaminated well is suitable for this purpose.
 2. Pour the diluted chlorine solution directly into the casing of a single tubular well, or into the annular space between the outer casing and the drop pipe, of a double tubular well.
 3. If the well is sealed and the pump drop pipe is not equipped with a foot valve at the bottom, and does not have a cylinder in the way, it is also possible to pour the solution down through the pump and drop pipe.
- B. **Dug Wells** - Dug wells which have become contaminated should first be pumped dry, cleaned, and the walls scrubbed down. If it is not possible to pump the well dry, the pumping should be continued until the water becomes clear. The well should then be allowed to fill, and, if the water is still not clear, it should be pumped out again.

When the water is clear, the well should be disinfected using the following quantities of 5 percent chlorine solution for each foot of depth of water in the well:

<u>Diameter of Well</u>	<u>Quantity 5 Percent Chlorine Bleach</u>
1 to 3 feet	1.5 Cups
4 feet	3 Cups
5 feet	4.5 Cups
6 feet	6 Cups
8 feet	12 Cups
10 feet	18 Cups

Add this quantity of chlorine bleach directly into the well interior.

- C. **Cisterns** Cisterns, spring collection basins, or drinking water storage tanks should be disinfected in the same manner as dug wells. Pump out, or drain the water in the cistern; scrub down the interior walls; fill or allow the tank to refill with clear water; and, if it is not known, calculate the capacity of the tank or containment by using one of the following formulas:

- a. Square or Rectangular Tank measure in feet:
Capacity (gallons) = Length x Width x Depth x 7.5
- b. Cylindrical Tank measure in feet:
Capacity (gallons) = Diameter x Diameter x Length x 5.9

- C. Add the amount of 5 percent chlorine solution indicated in the following table:

<u>Capacity (Gallons)</u>	<u>Quantity of 5 Percent Chlorine Bleach</u>
500	5 Quarts
750	7.5 Quarts
1,000	10 Quarts
2,000	20 Quarts
4,000	40 Quarts

This amount of chlorine bleach should be poured directly into the cistern or storage tank.

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SALVAGING FLOOD DAMAGED FOOD IN THE HOME

As a result of flooded conditions in homes, large quantities of foodstuffs may be submerged in flood water or sewerage backflow. While efforts may be made to salvage certain of these foods which have been contaminated, many items cannot be safely salvaged and should be destroyed. The following precautions are offered as a guide in the salvaging of flood-contaminated foods and containers.

1. Food in Sealed Metal Cans.

Remove labels. Thoroughly wash in soapy water by scrubbing with a brush. Immerse containers in strong chlorine solution (100ppm chlorine) for 15 minutes. Make the solution by adding an ounce of chlorine-type laundry bleach to a gallon of clean water. Dry containers thoroughly to prevent rusting.

2. Bottled Foods. (Carbonated beverages, milk, catsup, olives, and similar foods.)

These foods will usually contain contaminated water if submerged. Even if contaminated water has not entered the containers, they cannot be safely cleaned because all filth cannot be removed from under the edge of the closure. Such foods should be destroyed.

3. Fresh Fruits and Vegetables.

Do not salvage. Destroy. Note--foods listed in this and Items 4, 5, 6, and 7, are easily contaminated and may contain dangerous disease causing organisms.

4. Meats, Poultry, Fish.

Do not salvage. Destroy. Note--this does not apply to canned meats, fish, and poultry which may be salvaged as any other "canned food" (#1 above).

5. Lard, Butter, Oleo.

Do not salvage. Destroy. Fats in undamaged hermetically sealed cans may be salvaged as outlined in "canned food" instructions (#1 above).

6. Sugar, Coffee, Tea, Eggs.

Do not salvage. Destroy. If these foods are in hermetically sealed cans, they may be salvaged as outlined in "canned food" instructions (#1 above).

7. Cereals, Flour, Corn Meal, Etc.

Do not salvage. Destroy.

As a general rule, food should not be salvaged unless it is in a container that protects it and is one which can be thoroughly cleaned with soap and water and sterilized with boiling water or chlorine. Since paper, cardboard, wood, and most plastic food containers are not waterproof, foods in such containers which have been under flood water should be destroyed.

2. Allow Time for Disinfection of the Water Source and Distribution System.

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After the well, cistern, or storage tank has been dosed with the appropriate amount of chlorine, it should be pumped just long enough to bring the treated water through the pump to all faucets on the distribution system. The odor at the faucets will be a good test to indicate chlorine presence.

Directions For Disinfecting Wells And Water Sources

If the above dosages do not produce an obvious chlorine odor in the water, add more chlorine bleach solution until a distinct odor is noticed.

Let the chlorinated well and distribution system stand for 12 to 24 hours. This will allow time for the chlorine solution to disinfect the well, or water source, and distribution system.

After at least 12 hours, the system should be pumped to waste until no further trace of chlorine is noticeable in the water.

If you have public or municipal sewers, run each tap until the disinfectant odor disappears, while allowing the water to go down the fixture drain. If you have a septic system, it is preferable to first connect a garden hose to an outside faucet or hydrant and run the water into a roadside ditch or drainage swale, until the disinfectant odor disappears. Then, turn on each water faucet to discharge the chlorine residual in the immediate vicinity of the faucet.

3. Sample the Water for Bacteriological Analysis Before Use

Following disinfection of the water supply system, the water should be sampled for bacteriological analysis. Remember that no water should be used for drinking or food preparation, unless it is first boiled or treated, until a satisfactory report is obtained from a laboratory. The safety of water cannot be judged by color, odor, or taste. The organisms that cause water-borne disease cannot be seen.

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REHABILITATION OF BUILDINGS, FURNACES, FURNITURE, RUGS AND CLOTHING

Buildings Subjected to Floods:

Buildings which have been flooded should be examined carefully before being used for living quarters to make sure that they are safe and will not collapse. Loose plaster should be removed from the walls and ceilings so that it will not fall on occupants. Swollen doors and window sashes should be removed and allowed to thoroughly dry.

If water remains in the basement, it should be drained or pumped out as soon as possible. As the water is being removed, the mud should be stirred and carried away with it. After the basement has been allowed to thoroughly dry, floors and walls should be washed down with a solution of one pound of chloride of lime to six gallons of water or with a solution prepared from a commercial laundry bleach containing chlorine. Laundry bleaches, having 5.25% sodium hypochlorite, are good for this purpose. For use in basements as mentioned above, add one part of liquid chlorine laundry bleach to nine parts of water. Keep windows open for ventilation. Chlorine solutions are corrosive and should be mixed in plastic containers, enamel-lined metal pails or pans, or stoneware crocks. Do not apply solution to metal surfaces. Follow precautions printed on the chlorine container.

Walls, Woodwork and Floors:

Walls and woodwork, while still damp, should be thoroughly scrubbed with a stiff fiber brush and water to remove all mud and silt. Particular attention should be given to all corners, cracks, and crevices which should receive careful scrubbing. Floors should be cleaned of all mud and dirt and allowed to thoroughly dry. Artificial heat may be used with caution, however the temperature should not get high enough to cause steam (vapor) to rise from the floor and cause buckling or warping.

Redecorating should not be attempted for some time as it is useless to try to paint damp surfaces. Three or four months' drying time may be necessary before redecorating can be done satisfactorily.

Furnaces:

All parts of the heating system exposed to flood water should be thoroughly cleaned and dried. The smoke pipe and chimney should be inspected and cleaned, if necessary, and furnace doors or covers left open to ventilate the system. Burners should be removed if possible; cleaned, and allowed to dry to prevent rust and clogging of orifices.

Furniture should be moved to the sunshine and fresh air. Drawer-slides and other working parts should be stacked separately and allowed to air dry. All mud and silt should then be removed. Care should be
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exercised to remove the furniture from the direct rays of the sun before it is subject to warping. Stoves and other metal fixtures should first have all the mud and silt removed and wiped with an oiled rag, polished or painted. Books should be allowed to dry carefully and slowly with alternate exposing to air and pressing. Toward the end of this treatment, books may be subjected to small amounts of artificial heat.

Rugs and Carpets:

Rugs and carpets should be stretched out on a flat surface and allowed to thoroughly dry with alternate turning to prevent mold; followed by beating, sweeping or vacuum cleaning. Rugs that require shampooing should be washed with commercial rug shampoo products or with a soap jelly, and then wiped off, rinsed with clean water, and allowed to thoroughly dry. Soap jelly may be prepared by mixing one pint of mild soap powder or flakes with five parts of hot water and beat with an egg beater until a stiff lather is formed. Resizing may be done with a commercial or home-made material. Home made sizing may be prepared by mixing one-half pound of granulated glue to one gallon of boiling water. Stretch the rug out flat where it will not be disturbed, apply with a wide brush and allow to thoroughly dry. When practical, upholstery may be cleaned by following the procedures outlined for rugs.

Clothing and Bedding:

Flood-soiled clothing and bedding require considerable care to obtain satisfactory results. All loose dirt should be brushed off, followed by thorough cleaning.