

**EMERGENCY SANITATION GUIDELINES**  
**FOR**  
**ENVIRONMENTAL HEALTH PERSONNEL**

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## BACKGROUND

The people and places of Oregon are subject to a variety of natural and manmade hazards including floods, windstorms, drought, and events involving hazardous materials. These hazards create and damage destruction, which may produce special environmental health problems. The nature of most emergencies requires that quick remedies be applied so that serious health problems do not arise.

This publication provides recommendations on sanitation issues in emergency situations. It has been prepared for use by environmental health and emergency service personnel as a companion document to the Disaster Handbook for Extension Agents. That handbook is available at all County Extension Offices and most County Health Departments in Oregon.

This handbook was originally drafted in 1978 by a special task force representing the following agencies:

Oregon Department of Agriculture  
Oregon Health Division  
Oregon State University Extension Service  
Oregon Department of Environmental Quality  
Oregon Emergency Services Division  
Clackamas County Public Health Division  
Wasco-Sherman County Health Department  
Marion County Environmental Health Division  
Lane County Environmental Health Division

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## Section 1

# Water Supply

Following a disaster, one of the problems encountered is that of providing a safe reliable supply of drinking water. Because of the difficulty in detecting and correcting contamination at this time, the public should be advised to disinfect all drinking water until further notice from local and state health officials.

Where water service has been interrupted, it will be necessary to transport water from auxiliary sources into an affected area. Advanced plans must be made to provide a minimum amount of safe water until a community water supply is repaired. Special consideration must be given to emergency lodgings, feeding centers, hospitals, institutions, etc.

### MINIMUM WATER REQUIREMENTS

The per capita daily use of water in emergencies should be estimated as follows:

Drinking	3 pints
Cooking	2 quarts
Personal cleanliness	1 gallon
Laundry and Dishwashing	2 gallons
Total (Approx.)	4 gallons

The above per capita may be reduced to 1 gallon per day for short term emergencies.

### STORING WATER

A household may meet minimal water needs by using stored water or draining the water from the interior plumbing and hot water heaters. When prepared and stored as outlined, water can be kept for an indefinite period and used for drinking and other domestic purposes. If taste is to be considered, replace stored water every few months.

1. Select water tight containers, preferably glass or other non-corrodable materials such as jars, gallon bottles, plastic jugs, or crocks. Used containers should be cleaned and sanitized before use.
2. Wash the container with soap and water and rinse thoroughly. Sanitize with a bleach solution made up of 1 tsp bleach in 1 gallon water.
3. Fill with tap water from a safe water source.

4. Add two drops of ordinary household bleach (5.25% available chlorine such as Purex or Clorox) for each one gallon of water stored. If the water from the tap is not clear, increase the amount of bleach to 4 drops. (Note: Do not use scented products or those containing soap additives.)
5. Close container or cover with a dust-proof lid.
6. Store in a dark place (prevents growth of algae) and out of way of chance contamination and breakage by children and pets.

To use the water still in plumbing pipes, shut off the water to the home or structure. Turn on the faucet in the highest point in the structure allowing air into the system. Draw water as needed from the lowest faucet in the structure. To obtain water from a hot water heater:

1. Turn off main gas valve at the hot water tank or turn off the electrical circuit breaker to the hot water heater and close the inlet water valve on the tank.
2. Open the hot water tap and allow water to pour from the tap, or break the union on the cold water inlet of the tank and obtain water from the tank drain.
3. Allow the water in the container to stand until sediment drops to the bottom. Water from the bottom of the tank usually contains sediment that is non-harmful. Use the clear water from the top as the sediment settles. Disinfect this water before drinking in accordance with the following instructions:

## **EMERGENCY HOME WATER DISINFECTION**

Small quantities of water may be disinfected to destroy harmful bacteria by one of the following methods:

Boiling – Bring water to a rolling boil for one (1) minute. Allow the water to cool and then store in a sterile, covered container. If the taste is flat you may aereate the water by pouring the water back and forth from one clean container to another to allow air to be absorbed. This boiling method is the safest and simplest way to treat small volumes of water.

Iodine – Use ordinary household tincture of iodine (2% iodine and 2.4% sodium iodide). For each gallon of clear water to be treated, add 8 drops of iodine. For muddy or mossy water, use 15 to 25 drops of iodine for each gallon of water. Stir well and allow to stand for 30 minutes. At the end of that period, the water should have a distinct medical taste. If not, add more iodine.

Chlorine – Use ordinary household bleach (5.25% available chlorine such as Purex or Clorox) For each gallon of clear water to be treated, add 5 drops of bleach. Stir well and allow to stand for 30 minutes. (Note: Do not use scented chlorine or brands using soap additives.) If the water is from a surface water source (creek, stream, river, pond, etc.) boiling is the preferred method due to the possible presence of parasites.

### DISINFECTION OF LARGE VOLUMES OF WATER

To disinfect large volumes of water, pour ordinary household bleach or a chlorine disinfectant diluted to a 1% solution (Table 1) into the water.

Table 1

Preparation of 1% Chlorine Solution  
From Various Chlorine Products

Product	Form	Available Chlorine	Amount required to make a 1% solution when diluted to one gallon of water
Purex	Liquid	5%	3.25 cups
Clorox	Liquid	5%	3.25 cups
HTH – 15	Powder	15%	2.5 cups
Chlorinated Lime	Powder	25%	1.0 cups
B-K	Powder	50%	.5 cups
HTH – 70	Powder	70%	.33 cups
Perchloron	Powder	70%	.33 cups

**Note:** When using the solution forms, dilute the proper amount of chlorine shown above with water to make one gallon of solution. When using the powder forms, mix with the proper amount of fresh chlorine powder with a small amount of water to form a paste. Gradually dilute to one gallon of water, and allow the inert material to settle. The clear solution should be poured off and stored. The prepared solution must be stored in a tightly stoppered bottle in a dark place. This solution will lose its strength in a few weeks so it must be replaced frequently. Prepared 1% solutions are available commercially and are economical for small quantities.

**EMERGENCY PIPE LINES** see Table 2

In some instances it may be necessary to install an auxiliary pipe line from the source of water to the point of distribution. In an installations of this type, the pipe should be laid on top of the ground. Any conventional type of pipe that is normally used to convey water under pressure could be used.

In selecting pipe for emergency installations, the following items should be considered: availability; portability; ease of installations; dependability. The following type of pipe is recommended for emergency installations.

1. Aluminum irrigation pipe: available in long lengths; quick type couplings; portable; readily available where irrigation is practiced.
2. Plastic pipe: light weight; very long lengths; can be installed quickly; adapters are available for connection to other type of pipe.
3. Galvanized pipe: available in long lengths; can be installed quickly; most water departments have the tools and equipment necessary to install this pipe.

Use caution when handling or using these pipes near electric power lines to avoid electrocution.

**Table 2**

Determine diameter of pipe or tank and length of pipe or tank. Where lines intersect, read numbers of gallons.

		Diameter of pipe or tank															
		2 in	3 in	4 in	5 in	6 in	7 in	8 in	10 in	12 in	14 in	16 in	3 ft	5 ft	6 ft	9 ft	12 feet
length in feet	1	0.164	0.369	0.655	1.03	1.48	2.01	2.62	4.1	5.9	8.02	10.5	53.1	147.4	213	478	849
	2	0.328	0.738	13.1	2.06	2069	4.02	5.24	8.2	11.8	16.04	21	106.1	294.8	425	955	1698
3	0.492	1.107	1.965	3.09	4.44	6.03	7.86	12.3	17.7	24.06	31.5	159.2	442.2	636	1433	2546	
4	0.656	1.476	2.62	4.12	5.92	8.04	10.5	16.4	23.6	32.08	42	212.2	589.6	849	1910	3395	
5	0.82	1.845	3.275	5.15	7.4	10.05	13.1	20.5	29.5	40.1	52.5	265.2	737	1061	2387	4243	
10	1.64	3.69	6.55	10.3	14.8	20.1	26.2	41	59	80.2	105	530.4	1474	2122	4774	8486	
20	3.28	7.38	13.1	20.6	29.6	40.2	52.4	82	118	160.4	210	1061	2948	4244	9548	16972	
30	4.92	11.07	19.65	30.9	44.4	60.3	78.6	123	177	240.6	315	1591	4422	6366	14322	25458	
40	6.56	14.76	26.2	41.2	59.2	80.4	105	164	236	320.8	420	2122	5896	8488	19096	33944	
50	8.2	18.45	32.75	51.5	74	100.5	131	205	295	401	525	2652	7370	10610	23870	42430	
100	16.4	36.9	65.5	103	148	201	262	410	590	802	1050	5304	14740	21220	47740	84860	
500	82	185	327.5	515	740	1005	1310	2050	2950	4010	5250	26520	73700	106220	238700	424300	
1000	164	369	655	1020	1480	2010	2620	4100	5900	8020	10500	53040	147400	212200	477400	848600	

**PIPE LINE DISINFECTION See Table 3**

A new pipeline, a pipeline that has been repaired, or a pipeline that has become contaminated must be disinfected before being put into service. The following procedure is recommended for pipeline disinfection:

1. Flush the pipeline thoroughly with safe water.
2. Determine the capacity of the pipeline (Table 2).
3. Chlorinate the pipeline at the rate of 50 ppm available chlorine (Table 3). Chlorine gas is the preferred chlorine source to sterilize water mains, but hypochlorite solutions containing 1% available chlorine are satisfactory.
4. Retain the chlorinated water in the pipeline at least 3 hours, and if possible, 24 hours. All valves should be operated while the pipe is filled with chlorinated water.

Following the required retention time, all of the chlorinated water should be thoroughly flushed from the pipeline with safe water.

**Table 3**

**Amount of Chlorine Compound Required To Yield 50 PPM**

Volume	70% HTH	25% chloride of lime	15 % clor	5% Purex; Clorox
100	1.0 oz	3.0 oz	.66 c	2.0 c
250	2.5 oz	7.5 oz	1.5 c	5.0 c
500	5.0 oz	1.0 lb	3.0 c	2.5 qt
1000	10 oz	2.0 lb	1.5 qt	5.0 gal
2500	1.5 lb	4.5 lb	1.0 gal	2.5 gal
4,000	2.5 lb	7.5 lb	1.5 gal	4.0 gal
5,000	3.0 lb	9.0 lb	1.75 gal	5.0 gal
10,000	6.0 lb	18.0 lb	3.5 gal	10.0 gal



## POTABLE WATER HAULING

When water hauling is required, equipment may be obtained by contacting the county emergency services department. The interiors of all tanks and containers used for hauling water, hoses, buckets, and other apparatus must be completely cleaned and disinfected before use. Cleaning of tanks is accomplished by scrubbing with a strong cleaning compound and thoroughly flushing with safe water. Carriers such as street sprinkling or gasoline trucks require special cleaning. Advance planning to identify sources of appropriate vehicles is beneficial.

1. Apply low pressure steam for 15 to 20 minutes. When a tank has contained oil or gasoline, steam must be applied for 90 minutes, or the tank must be sandblasted.
2. Wash the tank with a strong soap solution.
3. Scrub with high pressure hot water jet.
4. Disinfect the tank (Table 3) Allow the chlorinated water to stand for at least 2 hours. Drain the tank and flush with potable water.

Drinking water supplies taken from wells or supplies of unknown quality and stored in tanks for distribution must also be disinfected. To disinfect, add 1% chlorine solution (Table 2) and allow to stand for at least 30 minutes.. At the end of that time, the water should have a slight chlorine taste. If not, add more chlorine. If a chlorine test kit is available, test the water after 30 minutes.. The water should test at least 1.0 ppm free available chlorine. In order to maintain this chlorine residual, it may be necessary to add chlorine periodically to the drinking water.

**Table 4**

### DISINFECTION OF VARIOUS VOLUMES OF WATER

Volume of Water to be treated (Gallons)	Amount of 1% chlorine solution required
10	1.5 tsp
25	1.0 Tbsp
50	2.0 Tbsp
100	.25 cups or 4 Tbsp
500	1.25 cups
1,000	2.5 cups
2,500	1.5 qts
4,000	2.5 qts
5,000	3.0 qts
10,000	1.5 gal

## **WELLS AND SPRINGS**

Before obtaining drinking water from a back-up well or spring, the well or spring must be disinfected before distribution. When disinfecting a well or spring, the following procedure is recommended:

1. Calculate the total number of gallons in the well or spring.
2. After determining the total gallonage in the well or spring, add the proper amount of chlorine compound (Table 2) Best results are obtained when the chlorine compound is diluted to a 1% solution.
3. Mix the chlorine with the well or spring water thoroughly.
4. In well disinfection, the chlorinated water should be circulated by pumping it from the well and discharging it back into the well before the standing period is begun.
5. After adding the chlorine to the water, pump the chlorinated water through the entire system of pipes, tanks, and faucets until chlorine is noticeable at each faucet .
6. Allow the chlorinated water to stand for a minimum of 4 hours before using. Wells and springs disinfected in this manner may be flushed to make the water more palatable.

## **CONTINUOUS DISINFECTION OF A WATER SUPPLY**

The installation of a chlorinator near the source of supply is the best way to continuously disinfect water. Portable chlorinators used in swimming pools and sewage treatment plants may be obtained for use. Water should be chlorinated at a rate of 1.0ppm with a chlorine compound such as household bleach with a contact time of at least 30 minutes. Portable chlorinators should be installed under the supervision of the county public health authority.

## **CHLORINE TASTE IN WATER**

A chlorine taste in water may indicate too much chlorine in solution or it may indicate that the chlorine has reacted with other material in the water to form chloramines – chemical compounds not nearly as effective in disinfecting water as is free chlorine. This would require the addition of more chlorine. To identify the true cause of the taste or odor problem, use a chlorine test kit capable of measuring both types of chlorine. The goal is to maintain free chlorine residuals of 10 ppm which is below the taste threshold for most persons.

## **CONTAMINATION OF WATER WITH RADIOACTIVE MATERIALS**

If water is known to be contaminated with radioactive material, it should not be used until it has been cleared by the State Health Division Office of Radiation Control (229-5797). Chlorination and boiling will not remove radioactive materials.

## **Section 2**

### **SEWAGE DISPOSAL**

#### **INDIVIDUAL SEWAGE DISPOSAL**

Damage to sewer systems or public water supply systems must result in the failure of water carried sewage disposal systems in homes. Individual waste disposal may be carried out as follows:

1. Deposit human excreta in paper containers; store in water tight containers and dispose of by burial, at least one foot below ground. In heavily paved areas where burial would not be possible, collection can be arranged by coordinating with the county office of emergency services.
2. Where an auxiliary source of water is available and if the sewer system is operable, flush toilets by pouring two or three gallons of water into the bowl. Water that is transported into an affected area for drinking purposes should not be used to flush toilets.
3. Where ground space is available, establish temporary pit or trench toilets for single family use.

#### **EMERGENCY PUBLIC TOILETS**

Public toilets will have to be provided for emergency hospitals, emergency lodges, and feeding centers which may be located in areas where there are public sewers or where the sewer system is inoperative. Emergency toilets can be divided into two classes: temporary or semi-permanent. Local circumstances will dictate which type of emergency toilets should be provided. Generally, temporary facilities should be installed for the period of one week or less. Advance planning to identify sources of portable toilets and time periods for their delivery is important.

Public toilets should be provided at the rate of one toilet for every twenty-five persons with at least one for each sex. Hand washing facilities should be provided at the same ratio as toilet facilities.

## **SEMI-PERMANENT TOILETS**

### Chemical Toilet

1. Where commercial chemical toilets are not available, the most desirable container to use is a 16 gallon galvanized iron garbage can or other equivalent container. For home use, a 5 gallon can is satisfactory.
2. Make a seat using cleats on the underside of a regular flush toilet to avoid sliding, or construct a seat.
3. Facilities should be located close enough to be accessible but not so close as to create a nuisance. Provisions for privacy are important.
4. Put 2.5 gallons of water and .5 pound of lye, caustic soda or caustic potash in the can. If these materials are not available, use 2.5 gallons of water and add one gallon of 5% chlorine bleach, .5 pound of chlorine powder, or 1.6 pounds of chlorinated lime.
5. At the end of the day or when the can is full, the can should be emptied into an operating sewer or its contents buried and covered with at least 12 inches of tamped earth. The can must be thoroughly cleaned with soap and hot water and disinfected each time it is emptied. Chlorine products may be used for disinfecting purposes.

### Trench or pit toilet

1. Construct a box 2' by 8' and 1.5' deep with four seats and self-closing covers.
2. The trench should be 1.5' by 7' by 4' deep.
3. Place the box over the trench overlapping the trench 3" on each side. Tamp earth around the base of the box to prevent the entrance of flies.
4. The trench should be abandoned when it is filled to within a foot of the top. The trench should be covered with lime and then tamped with earth.
5. The toilet box may be moved to a new trench as often as necessary.
6. Shelter may be provided by a tent, burlap or wooden screens.
7. A pit toilet is similar to a trench toilet. Add a wood floor and a wood frame cover, increase the depth of the pit to 6 feet. This type of toilet is advisable during inclement weather.

## **TEMPORARY TOILETS**

### Trench (straddle trench)

1. Excavate a trench 1' by 2' and as long as necessary.
2. Seats are not provided.
3. After use, the material in the trench must be covered immediately with earth.
4. The bottom of the trench should be sprayed daily with a suitable larvacide.
5. Canvas, wood, or burlap screens permit privacy.

### Manhole toilet

1. Construct a seat over a manhole or a catch basin in an operating sewer.
2. Flush the sewer with water to keep the material from depositing.

## **MAINTANENCE OF TOILET FACILITIES**

1. Toilet facilities should be inspected frequently to insure sanitary conditions at all times. In large installations someone must be on duty continually to see that the toilets are functioning properly and sanitation is maintained.
2. Where trenches are not protected from flies, the waste in the trench should be sprayed daily with a suitable larvacide.
3. The seat covers must be closed when the seat is not in use. Toilet seats should be cleaned and disinfected with a strong chlorine solution at least daily.
4. Odors from trenches and pits can be minimized by treating with quicklime at the end of each day.
5. Toilet paper must be provided. Soap and water should be available at the wash basins. Paper towels should be provided if possible.
6. The toilet area must be kept clean and in a sanitary condition. Floors, toilet seats, and wash basins must be cleaned and disinfected daily with a strong chlorine solution.
7. Flush toilets required an adequate amount of water to operate properly. A supply of water must be available at all times.

## **COLLECTION AND DISPOSAL OF TOILET WASTES**

If it is not possible for people to dispose of human waste on an individual basis, it will be necessary to arrange for the county office of emergency services organization to provide a collection source to gather waste from effected areas. Human waste should be collected in water proof containers or in tank trucks. Collection of waste from emergency hospitals, first aid stations and emergency lodgings should be made daily.

The waste may be disposed of by pouring the material into an operating sewer at a point where water is available to flush the material and keep it from depositing in the pipe line. Toilet wastes may also be disposed of by burial. A disposal site should be selected in an uninhabited area at least 100' from a river or well, and in an area with low ground water table. A trench should be excavated, the waste deposited and covered with lime, and then covered with at least 2' of tamped earth. Earth should be mounded a foot above ground level and that area posted with a sign reading: CAUTION TOILET WASTE DISPOSAL SIGHT. An environmental health official should accompany the waste to the point of disposal to assure that it is properly disposed of.

## **CLEANING OR COLLECTION CONTAINERS**

Containers, pails, and chemical toilets used to collect wastes must be cleaned and disinfected when they are emptied. This is accomplished by scrubbing thoroughly with soap and hot water, cleaning with steam and disinfecting with a strong chlorine solution.

## **BROKEN SEWERS AND SEWAGE FLOODING**

One of the first long term recovery projects which should be carried out following an emergency is repair and restoration of damaged sewers, with priority to lines in proximity to water mains. Special attention to damage and power outages affecting sewage pumping stations is required. Flooded basements must be pumped out and surfaces wetted by sewage scrubbed and disinfected with a strong chlorine solution. Open ponds of sewage require heavy applications of lime followed in serious cases by chlorination. Posting is important in areas where sewage ponding is excessive. The sign should be warn about the presence of raw sewage. **DO NOT DRINK OR PLAY IN THIS CONTAMINATED WATER.**

## Section 3

### **FOOD SANITATION**

Reestablish current environmental health standards regarding the production, transportation, storage and preparation of food in the disaster area as soon as possible. The principle problems relating to food sanitation involve the adequacy of sanitation facilities; personal hygiene of food service workers; food preparation, serving and storage; clean-up and sanitation of dishes and utensils.

#### **SELECTION OF EMERGENCY FEEDING CENTERS**

Established, permanent facilities including restaurants, schools and churches should be used when possible. The local Environmental Health authority determines whether suitable sanitation standards can be maintained in available facilities. In some cases auxiliary equipment may be required.

The feeding center should be operated only after the local Environmental Health authority has determined: the number of people the center will handle; necessary alteration or expansion of facilities including auxiliary equipment and sanitation supplies; the number of and type of food service workers needed.

#### **FOOD PREPARATION**

1. Utilize food which requires a minimum of preparation and handling.
2. Prepare only enough food to meet immediate requirements for one meal. Leftovers must be stored under refrigeration if they are to be reused.
3. Avoid raw foods unless safe water is available. Wash all fruits and vegetables. Separate leafy vegetables and wash each leaf individually.
4. Do not use unlabeled materials. Unlabeled insect and rat poisons may be mistaken for powdered milk or flour.
5. Thoroughly boil for 20 minutes any low acid, home canned vegetables (beets, green beans, asparagus) to destroy botulism toxin.
6. Avoid unnecessary handling of food. Use forks, ladles, and other utensils.
7. Cover food to protect it from dust, sneezing, coughing, rodents, insects, and other contaminants.
8. Store perishables at temperatures below 45 degrees Fahrenheit. (Note: a bayonet thermometer is recommended to check temperatures.)

## **FOOD STORAGES**

1. Refrigerate at or below 45 degrees Fahrenheit, any food, beverage, or ingredient consisting in whole or in part of milk, milk products, eggs, meat, fish, poultry, or any other food capable of supporting rapid and progressive growth of microorganisms which can cause food infection or food intoxicants.
2. Protect dry food from insects and rodents by storing in clean garbage cans, metal drums, wooden barrels or other water proof container with a tight fitting lid. Line these containers with plastic prior to use.
3. Store cooked foods at temperatures above 140 degrees Fahrenheit or below 45 degrees Fahrenheit. If this is not possible, use the cooked food immediately or discard after four hours.

The following facilities may be built and used in an emergency to store and preserve food:

### Suspended Food Containers:

A tightly screened box suspended from a tree branch or tripod. Wet burlap aids in keeping out dust and lowering temperatures.

### Water Tight Containers:

When immersed in cold water, can be used for storage of perishable foods.

### Underground storage Pits:

When lined with burlap over a rock or wood floor, makes use of lower ground temperatures. Food must be in rodent proof containers.

### Underground Ice Box:

In a large hole, place one box within a larger box with a 3 to 6 inch space separating walls and the bottoms of the inner and outer boxes. Fill the space between the walls with ice, or sawdust, grass, hay or other insulating materials.

### Vegetable Bins:

Spaced slats permit free circulation of air around vegetables. Slope the bottom of the bin to allow the oldest vegetables to be used first.



## **FOOD SERVICE WORKERS**

These workers should be experienced and must be healthy with no boils, cuts, or infections on their faces and hands. Personal hygiene among workers is essential and must be strictly enforced. Food service workers must follow these rules:

1. Wear clean, washable clothing.
2. Avoid sneezing or coughing on food.
3. Wash hands often, and always after using the toilet or smoking.
4. Avoid unnecessary handling of food.
5. Keep work area clean and sanitary.

## **FOOD SERVICE**

The following rules apply when serving food:

1. Service is provided by food service workers only. Self service should not be extended.
2. Use paper plates and cups when possible. Paper service should be kept dry and in the original container until ready for use.
3. Arrange the serving line to protect food from the consumers. Consider the use of sneeze guards and/or covering the food as appropriate.
4. Prevent or minimize hand contact with food through use of utensils.

## **CLEANING DISHES AND UTENSILS**

Normal dishwashing facilities should be used whenever possible. When hot water is not available, a dishwashing machine may be used for washing and the contents disinfected in a separate tank. Dishes and utensils may be used. One of the following methods should be used when washing dishes by hand.

1. Wash thoroughly in a tub of tepid water with soap or detergent. Rinse in a second tub. In a third sanitizing tub, totally immerse the dishes in hot water for 2 minutes. The sanitizing water should be boiling although water over 180 degrees Fahrenheit is acceptable.
2. Wash thoroughly in a tub of tepid water with soap or detergents. Rinse in a second tub. In a third sanitizing tub, totally immerse the dishes for 2 minutes in a clean water rinse to which hypochlorite solution (Purex, Clorox) for every 5 gallons of water (300 ppm). Check and renew the strength of the chemical rinse every 2 hours.

## **HAND WASHING FACILITIES**

When hand washing facilities are not available, a solution for disinfecting hands must be provided. Use a 27% solution of Cresol (Lysol) at 50 ppm of chlorine or an equivalent quaternary ammonia chloride solution. Dry hands with paper towels after application if available.

## **EXAMINATION AND SALVAGE OF FOOD SERVING EQUIPMENT\***

### Destroy Items that cannot be Salvaged

Condemned goods must be properly and completely disposed of. This disposal can include incineration and/or the use of sanitary landfills. Guards will be necessary to assure no scavenging or looting takes place. For insurance and tax purposes provide records of condemned items to their owners. Reputable dealers want assurance their products are completely destroyed and will not reappear as damaged merchandise. Maintain evidence including pictures, product samples, or written observations on any condemned goods.

The following is a list of some of the more common items which cannot be satisfactorily salvaged or sanitized after being contaminated:

**DRIED BEANS, WHEAT AND GRAIN** may not be salvaged for human use, but may be denatured and used for animal feed.

Products in CONTAINERS WITH SCREW, PRESS OF OR VACUUM SEALED LIDS are not suitable for salvage since the contamination collects under the lid and cant be satisfactorily cleaned or sanitized. This includes soft drinks, beer, wine and liquor.

BUTTER, CHEESE AND FAT may not be salvaged for human consumption, but may be denatured with fish oil or other suitable material and sold for glycerine or soap making purposes.

CANDY, CEREALS, BREAD AND CAKES, CHEWING GUM, SALTED, SHELLED OR SHELL NUTS. These products usually in paper boxes, in wrapped package or in glass and cannot be salvaged for human use. These products (except salted nuts and chewing gum) may be denatured with fish oil, charcoal dust or other suitable material and used for animal feed.

COFFEE, FLOUR, MEAL, SUGAR AND SIMILAR PRODUCTS in cloth or paper containers which have become contaminated must be destroyed or denatured for animal feed. This type of product in torn or broken packages must be considered adulterated and treated as such.

DRIED FRUIT must be destroyed or denatured for animal feed.

EGGS either in the shell or frozen in slip cover cans cannot be salvaged for human food and must be disposed of or denatured and released for animal feed.

FRESH FRUITS AND VEGETABLES-practically none of these foods can be salvaged after contamination with filth. This is particularly true of such food as lettuce, cabbage, celery, and any other foods that will be used in the raw state. Fruits such as apples, peaches, plums, grapes, ect. Cannot be salvaged and must be destroyed.

MEAT. No meat (except some canned products) can be salvaged. Meat may be denatured and sold to a rendering plant. No raw meat is permitted to be sold as animal feed unless it is properly cooked in appropriate cooking facilities. Denaturing with kerosene may precede tankage unless a meat inspector or designated authority can accompany the meat to a rendering plant.

SYRUP AND HONEY. They type of containers in which these products are packed generally prohibit salvage for human consumption. These products may be used as denaturing materials for some food stuff such as flour, meal, dry cereal, ect.

SOAKED BARRELS OR SACKS. When the sugar or salt contents have been dissolved they are irretrievably damaged. If the bags are only wet, it may be possible to salvage the sugar or salt by returning it to the factory for recrystalization. This is only of value when there are large quantities concerned. Dried milk or powdered eggs may be used for stock feeding by mixing with the other products such as grains.

POTENTIALLY HAZARDOUS FOOD ITEMS where temperatures have reached 41 degrees Fahrenheit or higher, for a period greater than one hour. This includes butter, cheese, milk, milk products, fish and shellfish.

HEAT DAMAGED FOOD ITEMS that were noticeably charred or in the immediate proximity of a fire. Extreme heat can recook contents of canned goods and adversely affect the contents.

FROZEN FOODS with an internal product temperature of higher than 10 degrees Fahrenheit must be immediately consumed or destroyed. DO NOT RE-FREEZE

SMOKE DAMAGE to foods is probably the most difficult to assess. Insoluble tars and plastics and their by-products may be suspended in the smoke and are a major concern. All meats exposed in the smoke must be disposed of unless salvaged under the guidance of the Oregon Department of Agriculture for use as tankage for animal feed. Oil products such as butter readily absorb smoke with a resulting "off" taste and odor.

CHEMICAL CONTAMINATION of food can occur by chemicals used in the fire fighting, explosions, breakage of bottles or aerosols or insecticides, rodenticides, and household cleaning items. Any indication of food being contaminated (microbiology or chemical) renders it unsalvageable. Refer these materials to the Oregon Department of Agriculture.

TOBACCO. Manufactured tobacco in paper containers must be destroyed. Loose leaf tobacco can be salvaged as fertilizer.

RUBBER GOODS AND DRUG SUNDRIES such as personal articles, baby nipples, rubber catheters of small size and various other small articles that come in contact with the human body cannot be salvaged and should be destroyed.

SURGICAL SUPPLIES such as gauze, surgical needles, bandages, adhesives, etc. cannot be salvaged and must be destroyed. Metal instruments may be cleaned, disinfected by boiling and covered with a film of neutral oil to prevent rusting.

\*Information in this section was developed from materials included in a short course on Current Concepts in Food Protection sponsored by U.S. Food and Drug Administration, Cincinnati training Facility, 1976 and from information provided by the Oregon Department of Agriculture.

Permit recondition of salvageable items, only with close supervision of the Oregon Department of Agriculture or designated environmental health authority.

Some items that can be salvaged by approved methods are:

EMPTY FRUIT JARS, CANS, BOTTLES, ETC. These may be salvaged by thorough washing with a suitable cleanser and sanitized by immersion in 100 ppm chlorine solution for two minutes.

CANNED GOODS. Some canned goods may be salvaged by washing dirt from the cans and dipping them in a solution of 100 ppm chlorine for two minutes. The cans should be air dried or wiped with clean cloths immediately to prevent rusting.

The cans that can be satisfactorily treated in this manner are:

1. The hermetically sealed can in which most canned foods are packed. Bent cans may be salvaged provided the seams are not involved and the vacuum is maintained.
2. The type of cans with a key when the key is removed and the key tab lifted to clean underneath.

Questionable items should be tagged with instructions to segregate and hold until a recommendation has been obtained from the State Department of Agriculture or the State Health Division.

## **DENATURANT MATERIALS**

Care must be taken not to use a harmful or poisonous denaturant if the food is to be used as animal feed. Some denaturants that can be used on food stuff are: fish oil, charcoal dust, tankage, other feed such as cracked corn, barely, shorts, grain, sorghum, oats, etc., other contaminated food such as cereal, syrup, or any other similar material would render the product useless for human consumption, but could be used as animal feed.

For products to be destroyed suitable for denaturants include kerosene, crude case oil, gurry, fuel oil, creosote, etc.

Some of the denaturants listed are not suitable for some products and care must be taken to see that the product to be denatured is rendered completely useless for human use.

## **CLEANING AND SANITIZING**

The articles to be salvaged must first be completely cleaned with a suitable cleanser. If the product has been submerged in contaminated water such as flood water, water from ditches, rivers, lakes, etc. or water resulting from fire, the label must be removed in order to properly clean and sanitize the product.

After cleaning and rinsing, the product must be sanitized in a solution of 100 ppm Chlorine for at least two minutes. Immediately, air dry or wipe to prevent rusting or leakers.

No reconditioning or merchandise should be attempted unless adequate facilities are available as approved by the Oregon Department of Agriculture. Salvage merchandise for human consumption must be sold in the original immediate container properly labeled in compliance with the Oregon Food Act.

## Section 4

### **SOLID WASTE DISPOSAL**

During the post disaster period, garbage collection will be irregular. In order to prevent health hazards caused by rodents and flies attracted to concentrations of garbage, auxiliary methods of solid waste disposal must be implemented.

#### **HOME GARBAGE DISPOSAL**

House hold garbage and refuse should be collected and separated into three groups, each requiring a different method of disposal.

1. Putrescible garbage (material that will spoil and decay) should be stored in water proof, rodent proof, containers and disposed of by burial. When feasible, bury it daily. Under no circumstances should this garbage be stored longer than four days. A burial hole 2' x 2' and three feet deep will be satisfactory for one family. The daily accumulation of garbage should be placed in the hole and covered with at least six inches of tamped earth. When the hole is filled to within a foot of the ground surface, fill the hole with earth and tamp thoroughly.
2. Non-combustible refuse (bottles, tin cans) may be stored in boxes or other containers in an open area until it can be collected. Such items as tin cans should be rinsed as thoroughly as possible, opened at both ends and flattened. Glass containers should also be cleaned.
3. Combustible refuse (paper, cartons) may be burned unless there is danger of the fire spreading. A satisfactory home incinerator can be made from a 50 gallon drum or similar container. Advance planning to identify sources of these drums is helpful.

#### **GARBAGE DISPOSAL FOR INSTITUTIONS**

Regular garbage collection and disposal must be provided for emergency lodgings, feeding centers, etc. Garbage and refuse should be collected every other day and disposed of in a sanitary manner.

It is recommended that one 30 gallon refuse container with cover be provided for each 30 persons. To make disposal easier, garbage and refuse should be separated into the following classes:

#### Putrecible garbage disposal:

This method should NOT be used in a high water table area. Dig a trench 8' deep 50' long and twice the width of the earth moving equipment operating at the site. Refuse from 10,000 people requires approximately 700 cubic feet of land area per day for disposal. As the garbage or refuse is unloaded, it should be spread and compacted on about a 30 degree ramp at one end of the trench and covered with earth and compacted to a depth of six inches at the end of each day. When the trench is filled within two feet of the top, fill with earth to ground level and compact thoroughly.

#### Non-combustible refuse disposal:

Flattened tin cans, bottles, may be used for fill material. It is not necessary to bury this material immediately if it does not contain garbage. It may be recycled.

#### Combustible refuse disposal:

Combustible refuse can be disposed of by burning. The selected burning site must not be a fire hazard.

#### Hospital wastes:

Special care must be taken for disposal of potentially pathogenic refuse from hospitals. This refuse should be burned in an incinerator. If incineration is not possible, the refuse should be double bagged in plastic and buried in an area that will not contaminate a water table.

### **DISPOSAL OF DEAD ANIMALS**

Dead animals should be disposed of as soon as possible by burial or incineration, When dead animals cannot be removed immediately, they must be covered with unslaked lime until disposal. If livestock are involved, contact the Oregon Department of Agriculture regarding rendering.



## Section 5

### **SANITATION OF MASS SHELTERS**

Emergency lodgings must meet minimum sanitation requirements. Procedures contained in other section throughout this manual apply in the selection and operation of mass shelters.

#### **SPACE REQUIREMENTS**

The following minimum space requirements are recommended:

<u>Type of shelter</u>	<u>Space Per Person*</u>
Temporary shelters (up to 48 hours)	40 square feet
Temporary quarters (2-14 days)	100 square feet
Permanent quarters (over 14 days)	200 square feet

Children under 12 years counted as ½ person.

#### **WATER SUPPLY**

Shelters should be located on a safe water supply system. An auxiliary source of water should be available. Water samples must be periodically analyzed for potability by a designated person. Refer to section 1, Water supply.

#### **FEEDING FACILITIES**

The local Environmental Health authority must approve mass feeding arrangements. Refer to section 3, Food Sanitation.

#### **TOILET FACILITIES**

One toilet must be provided for each sex, at a ratio of one for every 25 persons. Hand washing facilities and be located near to toilet facilities. Refer to section 2, Sewage disposal.

#### **LAUNDRY FACILITIES**

Wash tubs, wash boards, soap, detergents, should be provided. Arrangements may be made to use the facilities in Laundromats or commercial laundries.

## **LIGHTING**

Exits, hallways, toilet facilities, and kitchens should be well lighted for safety and proper cleaning. Most types of lights are acceptable, but lamps with flames are not recommended because of fire hazards.

## **VENTILATION**

Select mass shelters with good room ventilation and natural lighting. The minimum window area is equal to 10% of the floor area. Windows should be easily opened and in good repair.

## **HEATING**

Heating units must be properly vented.

## **SAFETY**

All buildings designated for mass shelter must be inspected and approved by the local building inspector prior to occupancy.

## **JANITORIAL SUPPLIES**

It is recommended that the following supplies and equipment be available at each housing shelter. These are the responsibility of the organization operating the shelter.

Brooms  
Buckets  
Shovels

Waste baskets  
Mop

Garbage cans  
Floor Cleaning compounds  
Hypochlorite (Purex, Clorox,  
Master X, etc.)  
Toilet paper  
Soaps

## Section 6

### **VECTOR CONTROL**

#### **Insect Control**

Miscellaneous insects or arthropods, such as lice, bed bugs, and biting flies may be present year round. Fly control activities during a post disaster period may be necessary in order to control diarrhea diseases and prevent nuisance conditions. The season of the year and the type of disaster should be considered when evaluating the need for control activities. Unless fly producing conditions are especially favorable, Adult fly populations will not increase rapidly when temperatures are below 60 to 70 degrees Fahrenheit. Large scale control programs will generally be warranted only during the summer months. An effective sanitation program will probably be all that is necessary during the remainder of the year.

#### **ELIMINATION OF FLY PRODUCTION**

The proper disposal of wastes is of prime importance in a fly production:

1. Restore sewage disposal facilities or install fly proof emergency lantrines.
2. Store garbage and other fly producing wastes by burial or incineration.
3. Dispose of garbage and other fly producing wastes by burial or incineration.
4. Convert garbage dumps within fly range of populated areas to sanitary land fills or treat at weekly intervals with a suitable insecticide.
5. Inform individuals of steps that they can take to reduce fly production.

#### **FLY CONTROL BY SCREENING**

Emergency hospitals, feeding centers and mass lodging facilities should be screened to prevent the access of flies. Emergency toilets should be made fly proof.

#### **CHEMICAL TREATMENT**

Emergency hospitals, feeding centers and mass lodging facilities should be screened to prevent the access of flies. Emergency toilets should be made fly proof.

## **CHEMICAL TREATMENT**

Despite efforts to restore sanitation facilities, the use of pesticides may be required to supplement the sanitation effort and reduce fly populations.

If at all possible only trained licensed pesticide applicators should apply pesticides. In fact, many pesticides are labeled “restricted use pesticide.” These can be purchased and used only by licensed pesticide applicators.

In any event, all pesticides use or over-the-counter must be used only according to label information. The most important principle to follow when applying any pesticide is to read the label on the pesticide container and follow the directions and instructions provided on the label. The label at a minimum, includes information on the name of the pest to be controlled, directions for use, application rates, and precautionary statements. Using a pesticide contrary to any information of direction on the label is a violation of federal and state laws.

Pesticides are poisonous and special care must be taken to prevent:

1. the contamination of food and utensils;
2. prolonged contact of spray with the skin;
3. excessive breathing of sprays and aerosols;
4. the use of highly toxic sprays indoors.

## **INTERIOR SPRAYING**

To obtain immediate relief from adult flies, it may be necessary to treat the inside of buildings. Several over-the-counter formulations, primarily aerosols, are labeled for controlling flies inside buildings.

## **OUTSIDE SPRAYING**

Outside spraying may be necessary where flies are very abundant. Spraying may be required at garbage disposal sites, sewage disposal sites, manure piles and other fly production or accumulation points.

Fly control is generally directed toward adult fly populations in emergency situations although occasionally fly larvae are the stage selected for control.

Outside spray operations may involve the use of hand-held or power spray equipment depending upon the magnitude of the problem and availability of equipment.

A number of pesticides are labeled for fly control. For adult fly control approved pesticides include diazinon, malathion, permethrin and ciovap. For larval fly control approved pesticides include dimethoate, Vapona and Rabon.

## **RODENT CONTROL**

The amount of food and harborage available to rodents following a disaster can increase greatly; therefore, a sharp increase in the rodent population may occur. In order to prevent the transmission of rodent borne diseases and to prevent the contamination and destruction of food supplies, it will be necessary to practice rodent control measures. Rodent control activities include:

1. protection of human food;
2. removal of rodents' food supply;
3. elimination of rat harborages;
4. elimination of rodents by poisoning and trapping.

### **PROTECTION OF HUMAN FOOD**

Food should be prepared and stored in buildings that are free from rodents and rodent proof. It must be stored in rodent-proof containers such as metal cans or fruit jars. Food must never be left in the open over night. Food that has been contaminated by rodents should be destroyed.

### **REMOVAL OF THE RODANTS' FOOD SUPPLY**

Appropriate food storage and solid waste disposal will eliminate a major source of food supply for rodents.

### **ELIMINATION OF RAT HARBORAGES**

Many rat harborages are eliminated through appropriate collection and disposal of refuse. Boxes and lumber should be stacked a minimum of 18" off the ground. Further steps such as poisoning are unpractical unless environmental conditions that enhance or support rodent populations are first modified or eliminated. Rodent poisoning programs should compliment not supplement environmental sanitation measures.

## RODENT POISONING

As with other pesticide applications, the use of trained experienced rodent control personnel is preferred when rodenticides must be used.

The most readily available over-the-counter rodent baits will be the anti-coagulant series of rodenticides. Including in this series are diphacinone, warfarin, pival and chlorophacinone. Follow all directions and instructions on the rodenticide container label.

Anti-coagulant rodenticides are not single dose poisons. Repeated doses or feedings must be consumed by the rodents over a period of several consecutive days to be effective.

Bait mixtures must be placed in protected bait stations or feeding sites. These mixtures must always be secured from access by children and non-target animals.

Some general information that may be useful when planning the use of anti-coagulant baits to control rodents:

1. In addition to protecting children and non-target animals, shield the bait from the weather by using boxes, boards, pipes, or cans (bait stations).
2. Use shallow bait containers fastened to floor surfaces, or of sufficient weight to prevent the rodents from overturning or dragging them to their burrows. A roofing tack driven through metal or fiber containers into the floor reduces spillage.
3. Note locations of all bait containers so that inspections can be made rapidly and consumed bait replaced. Bait consumption is generally heavy right after initial placement, making daily inspection and replacement advisable for the first three or four days after regular feeding begins.
4. Smooth baits after each inspection so that new signs of feeding will show rapidly.
5. Replace moldy, wet, caked, or insect-infested baits with fresh ones.
6. Move bait to an area showing fresh rodent signs if successive inspections show undisturbed bait.

## **ECTOPARASITE CONTROL**

Mass shelters may expose people to populations of field rodents and increase the number of domestic rodents. The fleas, ticks, and mites that are present in their burrows can constitute a potential threat to the health of people who are in contact with them.

The assessment of each specific shelter area to determine potential problems and the decision to institute ectoparasite control should remain with the epidemiologists of the Oregon Health Division.

## **SNAKES**

Because rodents represent the food supply of snakes, elimination of rodents in a disaster will often discourage the presence of snakes in buildings. For detailed precautions on dealing with snakes, refer to the Disaster handbook for Extension Agents.

There are only two types of poisonous snakes in Oregon, but snakes can be considered a nuisance particularly in structures.

## Section 7

### **HAZARDOUS MATERIALS**

The words hazardous materials are used to identify a broad range of chemical substances which can be detrimental to the natural environment and the public health. Some of these materials represent immediate threats when inadvertently released into the environment. Others become hazardous only when they chemically react with other substances, including water or air. In the event of emergencies such as traffic accidents or natural disasters, hazardous material containers are susceptible to damage. Although some of the resulting spills can be contained, hazardous materials can become widely dispersed. The growing use of hazardous materials in industry, at home and on the farm, increases the risk from accidents. Following an accident, the rapid identification of toxicants and clean-up of contaminated areas become important.

#### **OREGON EMERGENCY RESPONSE SYSTEM (OERS) 1-800-452-0311**

A cooperative system of state, federal and local government and private industry, OERS functions to minimize damage to life and property as a result of hazardous materials incidents. It is complimentary to industrial activities and local response efforts. The system enables rapid communications between the accident scene and state and federal personnel with expertise in hazardous materials. OERS may be reached by calling toll-free 1-800-453-0311. This is purely a notification network. In Oregon, the department of environmental quality (DEQ) is the lead state agency for hazardous materials incidents. They will offer activities following the event. The States overall HAZ-MAT response network is explained in Annex O are the States Emergency Operations Plan. Copies of Annex O are available from your local emergency coordinator in DEQ headquarters office.

#### **THE FIRST THIRTY MINUTES**

Train derailments, truck collisions and plane crashes all have the potential of releasing hazardous materials. If you come upon or are called to such an accident, your immediate actions are recommended in coordination with the incident commander (usually a fire service representative).

1. Minimize exposure to contamination.
  - a. evacuate the area; this may involve those who are injured requiring first aid.
  - b. Stay out of any smoke, gas or vapor.
  - c. Avoid contact with the material



2. Identify the material and its approximate quantity.
  - a. Check the vehicle or container for identifying placards or
  - b. Locate the shipping papers. By law, they must be within reach of the vehicle driver, or
  - c. Obtain the EPA registration number from the vehicle registration number from the container.
  - d. In aircraft accidents, no material identification may be available. Obtain the vehicle registration number from the rear fuselage.
  - e. Do not touch damaged containers in attempting identification.
3. Notify local law enforcement authorities and the Oregon Emergency Response System, 1-800-452-0311
4. Carry out containment efforts in accordance with instructions received through the Oregon Emergency Response System.

## **RADIOACTIVE MATERIALS**

When notified of an incident which may involve radioactive materials, advise 1 (the immediate evacuation of the area, and 2) the detention of individuals who may have been exposed to radiation. Then notify:

Oregon Health Division, Radiological Health Section  
Portland (503)-229-5797  
Off-duty (503)-229-5599

And the OREGON EMERGENCY RESPONSE SYSTEM, 1800-452-0311.

## **WATER SUPPLY CONTAMINATION**

In the event where supplies become contaminated by Hazardous materials, contact the Oregon Accident Response System. They in turn will notify DEQ and the Health division. The DEQ may forward advice on containment procedures to take. The health Division will attempt to notify any downstream water systems of the spill so that system intakes can be shut down.

## **SALVAGE AND DISPOSAL OF HAZARDOUS MATERIALS**

No salvage or disposal of hazardous materials should be attempted directly by local Environmental Health personnel. A call to OERS will bring in experts who will carry out salvage activities and ensure that wastes are properly disposed of.

Note: It is recommended that all environmental health personnel receive the “Basic Awareness” training in Hazardous Materials. This is a 3-hour course in Recognition and Identification and is available through your local fire service or the State Fire Marshal’s Office.