



**Radiological Emergency
Information for Wisconsin
Farmers, Food Processors
and Distributors**
Near the Nuclear Power Plants

KEEP THIS BOOKLET!

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Wisconsin Emergency Management
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THE PURPOSE OF THIS BOOKLET

This booklet is prepared for Wisconsin farmers, food processors, and distributors. It provides basic data on radiation, how it is measured, and the biological effects of exposure to different levels of radiation. It also gives you the information about actions to take that will protect the food supply from contamination by radioactive material in the event of a serious incident at a nuclear power plant. This brochure also contains information, which will be useful to water utilities responsible for ensuring safe public drinking water.

EMERGENCY PLANNING

In the event of an incident at a nuclear power plant with a large radioactive release, one of the major concerns is to prevent the public from eating or drinking food or water contaminated with radioactive material. The danger in eating food containing radioactive material results from the cumulative internal radiation exposure to your body as you continue to eat the contaminated food.

For planning purposes, an Ingestion Pathway Emergency Planning Zone (IPEPZ) covering a radius of 50 miles has been established around each nuclear power plant in the nation. The Radiation levels found in most of the 50 radial mile area after a nuclear power plant incident will not be high enough to require evacuation of members of the general public. It is only within the area of 10 radial miles around the power plant that evacuation due to higher radiation levels may be required. Extensive planning and exercising has been done in the 0-10 mile area. In the 10 to 50 mile areas around a plant, the major threat to the public will come from ingesting food contaminated with radioactive material. Emergency plans have been prepared by State and county emergency management officials to advise you of the actions you should take if the need arises to protect the food supply and to prevent ingestion of contaminated food.

The Ingestion Pathway Emergency Planning Zone (IPEPZ) covers the area approximately 50 miles around the four Nuclear Power Plants affecting Wisconsin. The map on this page shows the area included in the IPEPZ for the Power Plants.



HOW YOU WILL BE NOTIFIED

There are several ways that you will be notified of an incident at a nuclear power plant if it is necessary to take shelter or evacuate. These include:

- If you live within 10 miles of the plant, warning sirens will be sounded and emergency instructions and information will be broadcast over the local Emergency Alert System if a protective action recommendation is made. If you live between 10 and 50 miles, emergency instructions and information will be broadcast over television and radio stations in your area.
- State and local officials will issue news statements containing emergency instructions and information.
- There would likely be continuous television and radio coverage of the nuclear power plant incident. This coverage will include news conferences held by State, local, federal and utility officials. These news conferences will contain information about the emergency actions you should take.

You should pay close attention to the information you hear over the Emergency Alert System, and the information you hear from State and local officials in the televised and broadcast news conferences. This information will contain official instructions which have been coordinated by Wisconsin Emergency Management and the Wisconsin Departments of Health Services; Agriculture, Trade and Consumer Protection; Natural Resources; and other appropriate local, State and federal agencies.

PROTECTIVE ACTIONS THAT YOU SHOULD TAKE

Wisconsin Emergency Management, in conjunction with the Wisconsin Departments of Health Services; Agriculture, Trade, and Consumer Protection; and Natural Resources and other State and federal agencies, will determine the protective actions that you should take. These protective actions could include instructions for the proper washing of food items before eating them, sheltering livestock and feeding them protected feed and water, the embargo of the sale and transportation of certain food and feed items, or other instructions which may be appropriate.

The State will use information from samples collected by State and federal personnel to determine the location and amount of radioactive contamination that has escaped from the plant. You will be notified through official broadcasts and news statements about the area affected by radiological contamination, and any protective actions you should take to protect yourself and the food supply.

ACTIONS TO PROTECT FARM ANIMALS

It is important to shelter animals, their feed, and their water supply. If livestock and dairy animals consume contaminated feed and water, some of the contamination will be absorbed in their bodies, and it could enter the human food supply through meat and dairy products.

There are a number of actions you can take to prevent your farm animals from consuming contaminated feed and water. Your distance from the power plant will be a key factor in determining the specific actions you may need to take. The closer you are to the plant, the more protective actions you may have to take. State officials will inform you about the actions you should take depending upon your distance from the nuclear power plant.

Removing farm animals from pasture and placing them in a protected place is the most effective way to limit their contamination by radioactive material. This can be done in two ways:

- If possible, put your animals in a totally enclosed barn, shed or other shelter, and limit entry of outside air and rainwater into the structure. Give them feed from totally enclosed barns, sheds, grainaries, and silos. Feed stored outside, which is directly exposed to air and rain, may be contaminated.

This includes feed stored in sheds and cribs with open sides, uncovered haystacks or bales, bunker silos and feed piles that are not covered and upright silos without roofs. Give your animals water that has been protected from direct contact with air and rain.

- If it is not possible to put the animals in a totally enclosed structure, try to reduce their exposure to contaminated soil, feed, water and air as much as possible. You can do this by keeping them in shelters with open sides, in an outdoor pen or by herding them into a wooded area.

Some form of sheltering is better than none. The best protection is in a totally enclosed structure that has roof and masonry, metal or stone walls. When animals are enclosed, remember:

- Do not overcrowd;
- Do not allow them to become overheated;
- Allow some air ventilation; and
- Provide water and feed from protected sources.

Remove dairy animals from pasture and feed lots first, followed by other types of livestock. Radioactive materials can quickly enter the food chain through milk and other dairy products, so it is essential that priority be given to protecting dairy animals. If you live in an area within 10 miles of the plant that has been evacuated, you will be allowed to temporarily reenter the area to milk and feed dairy cows if radiation levels are low enough for safe reentry.

Poultry can remain in their existing structures because they are normally raised under some type of shelter and given stored feed and covered water. Generally, eggs will be

safe to eat after they are washed in clean water.

If it is necessary for you to evacuate, and time permits, be sure to leave enough water and feed for your livestock (one day's supply or more).

If animals are exposed to radioactive particles or rainwater, they should be washed with uncontaminated water before being brought into a sheltered area. Persons washing the animals should wear protective clothing such as you would wear when applying pesticides.

Do not destroy, market or slaughter any animals unless directed to do so by State authorities. These animals should not be sent to market until they are determined to be safe for consumption, or until a decision is made to dispose of them. You will be instructed as to how to safely handle, decontaminate or dispose of any farm animals, which have been contaminated. Aquaculture operators should contact your extension agent or the Department of Agriculture, Trade and Consumer Protection..

Do not allow animals to graze unless directed to by your extension agent or other state officials.

Follow these procedures until state officials inform you that the level of radiation has decreased to a safe amount.

If you have questions about caring for your animals during an emergency situation, contact your extension agent.

ACTIONS TO PROTECT FARM LAND AND CROPS

Most farmland that is contaminated by a radiological incident can be used again for agricultural purposes. The length of time the land should remain fallow depends on the amount and types of radioactive materials that settled on the land. If your land is or may be contaminated, emergency officials will:

- Determine the types and levels of the contamination. This may require authorized officials to take samples of air, water, oil, crop and animal products, such as milk,

- Recommend treatment procedures such as idling the land for a specific period of time, liming the soil to prevent absorption of specific radioactive substances by the crops, and alternating crops or deep-plowing the soil to limit surface and plant exposure to contamination.
- Recommend alternative uses of land for a period of time.

Standing crops should be allowed to grow to maturity. The amount of radiation exposure that could occur would most likely not be strong enough to damage their growth and safety. Most contamination will either be washed off or will drop to safe levels during the growing process. Your extension agent or other official will advise you if special harvesting procedures will be needed or if other actions are required.

Contaminated grains that are permitted to grow to maturity will probably only require milling or polishing to remove the contamination. When grain or other feed is stored in an exposed location and not intended to be milled for feed, it can generally be made safe by carefully removing the contaminated surface layer of grain. Store this contaminated grain or feed separately until your extension agent or other official instructs you on handling.

Unprotected fruits and vegetables in the field may have radioactive particles on the surface. Leaves, pods and fruits should be washed or peeled before eating. Some leafy vegetables may be eaten after the outer layers are removed and the product is washed. Ripe fruits and vegetables may be lost if high levels of radioactive contamination prohibit entry of persons to harvest them. Those that do not need to be harvested immediately can be salvaged when the area has been determined safe for harvesting.

Roots and tubers such as potatoes and carrots can generally be eaten after they are washed and peeled.

Pasture and forage plants usually retain very little of the radioactive material deposited on them. The extent to which plants collect and retain radioactive materials depends on the amount and types of the radioactive substances, the nature of the soil and ground cover, the foliage characteristics, and the weather conditions.

Specific information on harvesting, sorting, and decontaminating your pasture and crops will be given to you by County and State officials as the need arises.

ACTIONS TO PROTECT HONEY

Beehives will have to be monitored by authorities to determine if contamination is present. Actions you may be asked to take range from destroying the hive, removing and destroying the affected combs, or storing the honey until the contamination levels are reduced to an acceptable level. If no contamination exists or a safe level is detected, honey may continue to be harvested.

ACTIONS TO PROTECT FISH

State and local officials will need to monitor fish raised in ponds or fish hatcheries to determine if contamination is present. If no contamination or a safe level is detected, fish may continue to be harvested.

PROTECTIVE ACTIONS FOR FOOD PROCESSORS AND DISTRIBUTORS

Food processors and distributors will also have to take actions to protect the food supply. They will have to comply with embargoes, which may be placed on the sale and transportation of food items that are found to be or believed to be contaminated with radioactive material. Additional protective measures will include preventing processing plants and facilities from becoming contaminated, the decontamination of those plants if the need arises, and preventing the contamination of food items which are shipped into or out of the area for processing or distribution. Any protective measures that are instituted will have to remain in effect until food samples can be collected and tested in a laboratory to determine if

they are safe to eat. In the event of an incident at a nuclear power plant, State and federal officials will give you more detailed information about the actions you should take.

WATER UTILITIES

Managers of water utilities will have to take actions to protect the water supply. Utilities which obtain their water supply from sources of surface water are of primary concern because surface water is the most easily contaminated by airborne radioactive material. Water obtained from wells is much less likely to be contaminated. State personnel will collect water samples at the supply source and at the treatment facility to determine if radioactive contamination is present. You will then be instructed as to the need to shut intakes into water purification facilities.

POST-EMERGENCY ACTIONS

Reentry and recovery activities will take place after the immediate danger of the emergency has passed and the contaminated areas have been clearly identified.

Initially, reentry into a restricted, contaminated area will be temporary and will be allowed only under controlled conditions. In all probability, this area will be within the 10-mile radius of the commercial nuclear power station. If you have been evacuated from your area, you may be allowed to return temporarily to your farm when conditions permit. State or local government officials will advise you through the commercial media or other official means if a decision to permit reentry is made. You will receive specific instructions on routes to use and safety precautions to take. Reentry will allow you to perform such vital activities as milking, watering, and feeding farm animals.

Recovery is the process of reducing radioactivity in the environment to acceptable levels for normal daily living. Following the emergency, State officials will identify the types and levels of contamination. They may take samples of air, water, soil, crops and animal products from your farm or business. They will provide you with instructions and assist you in decontaminating your animals, food and property if such

actions are necessary. Contaminated food will be isolated to prevent its introduction into the market place. State officials will determine whether condemnation and disposal are necessary.

You will be compensated for the losses you may suffer as a result of a nuclear power plant incident. Make sure that you carefully document all losses, which you incur. The utilities, which operate nuclear power plants in this country, contribute to an insurance fund administered by American Nuclear Insurers. These funds will be used to compensate members of the public for losses they may suffer.

Additional information can be obtained from your County Emergency Management or the local Cooperative Extension Service Office. Call these agencies for additional information.

STATE OF WISCONSIN

Wisconsin Emergency Management
(608) 242-3232

Department of Agriculture, Trade and Consumer
Protection

Emergency Coordinator (608) 224-5009

Manitowoc County—UW Extension
(920) 683-4168

Kewaunee County—UW Extension
(920) 388-7141

Pierce County—UW Extension
(715) 273-3531 ext. 6663

WHAT IS RADIATION?

Radiation is a form of energy. There are different types of radiation. The type known as “ionizing radiation” can cause physical or chemical changes if it enters or penetrates humans or animals. Ionizing radiation comes naturally from a number of sources in the environment, from radioactive elements used in certain medical treatments, or from the operation of a nuclear power plant. The ionizing radiation that comes from the operation of a nuclear power plant is under control and kept within the plant. If humans or animals are exposed to a very large amount of ionizing radiation, regardless of where it comes from, they may become sick or die.

Radiation is measured in units called millirems. The millirem measures the biological effect of exposure to radiation. The effect ionizing radiation will have on you will depend upon a variety of factors including:

- How far away you are from the source of radiation.
- The amount and part of your body that is exposed.
- The amount of radioactive material you breathe or take into your body.

The air around us, rocks, soil and the food we eat naturally exposes us to very low levels of ionizing radiation. Recently, we have become aware of the problems resulting from the presence of radon gas found in houses and buildings. We are also exposed to small amounts of ionizing radiation from medical and dental x-rays. Taken together, these sources of natural and man-made radiation expose us to about 360 millirems of radiation each year. The diagram on page 13 shows the sources of radiation exposure to the general population in this country. Operating nuclear power plants are listed under the part of the diagram called “other”. A nuclear power plant operating under normal conditions would add about 1 millirem per year to your radiation exposure if you lived across the street from the plant.

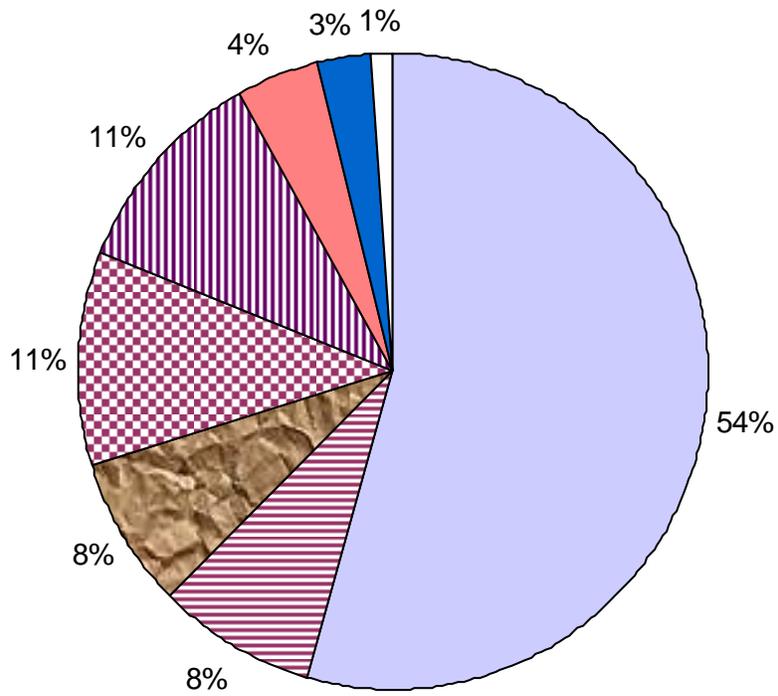
The less time you are exposed to radiation, the less chance you have of experiencing any detectable effects. The following table gives you the expected biological effects on humans from the exposure of your whole body to radiation for a 24-hour period.

Millirem* Expected Biological Effect on Humans

0 to 5,000	No detectable effect
5,000 to 50,000	Slight changes in your blood
50,000 to 100,000	Changes in your blood, nausea, fatigue
100,000 to 200,000	Changes in your blood, nausea, fatigue, vomiting. Up to 1% of the people exposed to this level of radiation may die if they do not receive medical treatment.
450,000 to 700,000	Up to 50% of the people exposed to this level of radiation may die within 1 month if they do not receive medical treatment.

*From the U.S. Nuclear Regulatory Commission's
Nuclear Power and Radiation Workshop Manual

SOURCES OF RADIATION EXPOSURE TO U.S. POPULATION



- RADON
- COSMIC (Outer Space)
- TERRESTRIAL (Rocks & Soil)
- INTERNAL (Inside Human Body)
- MEDICAL X-RAYS
- NUCLEAR MEDICINE
- CONSUMER PRODUCTS
- OTHER

National Council on Radiation Protection & Management

NOTES



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