

Radiological Emergency Information

**For Farmers,
Food Processors,
and Distributors**



Important Information

Please read and save this brochure

Read This First

This brochure is being distributed because a release of radioactive material from a nuclear generating plant in Minnesota has contaminated or has the potential to contaminate dairy, crops, livestock, water, and other foodstuffs in your vicinity.

There is no need to evacuate unless government authorities have instructed people in your area to do so. State, county, and local officials will warn you and your family if you need to evacuate or to take shelter.

The information and emergency response procedures found in this brochure should be followed to protect your family, farm animals, and food products. Refer to the table of contents for information and instructions.

Sources of Information

Radio and television stations will broadcast specific emergency information and instructions using the Emergency Alert System (EAS). If local television and radio are not broadcasting information about your area, tune to:

- KNOW (MPR — St. Paul) 91.1 FM
- WCCO (Minneapolis) 830 AM

Please do not call law enforcement authorities. Read this brochure first. If you still have questions, call:

- Outside the Twin Cities Metropolitan Area 1-800-657-3504
TTY Users (Relay Service) 1-800-627-3529
- Twin Cities Metropolitan Area 651-297-1304
TTY Users (Relay Service) 651-297-5353

For non-emergency questions and requests for more brochures, contact the Minnesota Department of Agriculture at 651-201-6640.

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First Steps

Upon receiving this brochure, state and local emergency response officials advise you to take the following steps immediately to protect food and water supplies:

- Cover outside feed supplies with a tarpaulin or other appropriate material.
- Cover open water sources.
- Remove dairy animals from pasture, shelter if possible, and provide them with protected feed and water.
- Protect other livestock and poultry by sheltering them if possible and providing them with protected feed and covered water.

Personal Protective Actions

If you live within 10 miles of the plant, you may be advised to take shelter (go inside) or to evacuate, if such actions are deemed necessary to help protect you and your family from potentially harmful levels of radiation.

Otherwise, if agricultural products are found to be contaminated with radioactive material, state and federal government officials recommend that you take the following personal protective actions:

- When you go outside, wear outer clothing that covers all parts of the body (for example, boots, gloves, coveralls, long-sleeved shirts, and long pants).
- Wash hands thoroughly before preparing or eating food.
- Wash, scrub, or peel fresh fruits and vegetables before eating them.
- Do not slaughter any animals.
- Do not use fresh milk from your dairy animals, vegetables from your garden, or eggs from your chickens.
- Do not engage in dust-producing activities, such as cultivating, disking, baling, or harvesting.
- Do not process or distribute agricultural products until officials declare them free of contamination.
- Do not transport or market food products.
- Do not fish or hunt.

Specific instructions will depend on the distance of your farm or facility from the commercial nuclear generating plant and on prevailing weather conditions.

Sources of Emergency Information

State or local government officials will issue specific protective actions for you to take as well as information to help you prevent or minimize radiation contamination of milk and food products.

- EAS will provide you with emergency information over designated radio and television stations. These stations also will provide additional emergency-related information.
- State and local agricultural officials, via EAS radio or television broadcasts, newspaper articles, or telephone, will provide you with information on protecting agricultural products.
- Additional emergency agricultural information may be available to you through state or local government emergency organizations.

Emergency Planning

Two types of planning zones may be referred to during a nuclear power plant emergency:

The Emergency Planning Zone (EPZ) is the area within a 10-mile radius around a commercial nuclear power plant in which people may experience direct exposure to radiation.

The Ingestion Pathway Zone (IPZ) is the area within a 50-mile radius around a commercial nuclear power plant in which people may experience indirect exposure to radiation by eating contaminated food or drinking contaminated milk or water.

The safety of the food supply within the 50-mile IPZ can become a concern to farmers and food processors/distributors if a radiological release to the atmosphere has occurred. During such a release, both water, crops, and land can become contaminated. Eating contaminated foods and drinking contaminated milk and water can have a harmful, long-term effect on your health and the health of the public at large.

State and local government emergency response organizations are prepared to quickly notify and advise farmers and food processors of a radiological emergency. Protective actions are based on emergency conditions at power plants, information available on the amount of radiation that has been released to the environment, and consideration of the health, economic, and social impacts of the proposed actions.

Protective Actions

Two types of protective actions exist that will help prevent or lessen the possibility of persons consuming contaminated food or water:

Preventive Actions prevent or minimize contamination of milk and food products. Example: Sheltering livestock and placing them on stored feed and covered water.

Emergency Actions isolate or contain food to prevent its introduction into the marketplace and to enable testing to determine whether condemnation or other action is appropriate. Example: Restricting or withholding (embargoing) agricultural and dairy products from sale by prohibiting transportation to and from the affected areas.

Protective Actions for the Food Supply

Location-specific protective actions are issued during emergencies. The following are examples of general preventive and emergency protective actions.

Milk

Remove all dairy animals from pasture, shelter if possible, and provide them with protected feed and covered water. Government officials may come to your farm to take milk, feed, and water samples for laboratory analysis to determine whether any of these products are contaminated. Do not drink milk or consume any dairy product from cows or goats until laboratory results are available.

Fruits and Vegetables

Wash, scrub, or peel locally grown fruits and vegetables to remove surface contamination. Prepare roots and tubers in this manner also.

Meat and Meat Products

You may be advised to place meat animals on protected feed and covered water and, if possible, to provide them with shelter. If livestock consume feed and water contaminated with radioactive materials, some of the contamination will be absorbed into their bodies and then could enter the human food supply through meat and meat products.

Food Processors and Distributors

Following a radiological emergency, government officials may restrict the movement of food products and withhold them from the marketplace (embargo). These products may not be released for use or distribution until they are determined safe for consumption or until a decision is made to dispose of them.

If disposal is necessary, you will receive instructions on safe handling and disposal. State and/or federal agriculture officials will meet with you to discuss this process and to establish timeframes.

Food processors and distributors may act to minimize exposure at their facilities by:

- Shutting down the air intake system,
- Closing windows and doors, and
- Implementing procedures to monitor incoming food ingredients

Radioactive contamination of milk or food products can occur during processing or during transportation. This may result from exposure to radioactive materials in the air, on the ground, or from contact with contaminated products. If contamination is verified, food and food products must be sampled prior to use or distribution.

Poultry and Poultry Products

Poultry raised outdoors, especially those kept for egg production, should be monitored by taking samples and performing laboratory tests to determine the presence of radioactive contamination. Contamination is unlikely among poultry raised indoors on protected feed and covered water. If contamination is verified, state or local government officials may advise that poultry and eggs not be consumed or marketed.

Fish and Marine Life

Fish and other marine life raised in ponds should not be harvested unless appropriate state or local government officials have analyzed samples and determined that they are safe to eat. Samples of water, fish, and marine life from open bodies of water may be analyzed to ensure that they are safe.

Soils

If soil is contaminated, government officials will recommend soil management procedures to reduce contamination to safe levels. Idling, the nonuse of land for a specific period of time, may be necessary in some cases. However, in situations involving highly contaminated soil, removal and disposal may be more appropriate. Planting alternative crops also may be recommended in some situations.

Grains

Most contamination on standing crops can be removed by wind and rain, depending on the stage of growth and whether grains are permitted to grow to maturity. Sampling and laboratory analysis will determine if the grain is safe to use. Contaminated and uncontaminated grains should be stored separately when harvested.

Water

Covered wells and other covered or underground sources of water probably will not become contaminated. Radiation contaminants deposited on the ground will travel very slowly unless soils are sandy. It is unlikely that underground water supplies will be affected.

Water intake valves from any contaminated water source should be closed to prevent distribution of contaminated water by irrigation or other processes.

Honey

Honey and beehives will need to be sampled and analyzed by state or local government officials if radioactive contamination is detected in the area. You will be instructed by these officials on how to handle the hives and honey.

Post-Emergency Actions

The following sections describe post-emergency actions that will occur if contamination is verified.

Re-entry

Re-entry is the temporary entry, under controlled conditions, into a restricted zone. If you are evacuated, you may be allowed, when conditions permit, to re-enter the restricted zone temporarily to perform essential tasks. Re-entry will allow you to perform such vital activities as milking, watering, and feeding farm animals. State or local government officials will advise you through the EAS or other official means if a decision is made to permit re-entry. You will receive specific instructions on travel routes to use and safety precautions to take.

Recovery

Recovery is the process of reducing radiation in the environment to levels acceptable for normal daily living. Following the emergency, state and local government officials will identify the types and levels of contamination. They may need samples of air, water, soil, crops, and animal products from your farm or food business. They will provide you with instructions and assist you in decontaminating your animals, food, and property if such actions are necessary. Contaminated milk and food products will be isolated (embargoed) to prevent introduction into the market place. State and local government officials will determine whether condemnation and disposal are appropriate. Unrestricted activity at your home, farm, processing facility, or distribution center may resume after concentrations of radioactive materials are reduced below limits set by the federal government.

Compensation for Financial Losses

If government officials direct you to evacuate, you will be eligible for reasonable emergency-related expenses that result directly from the nuclear accident. Evacuees will receive reimbursement for immediate and reasonable out-of-pocket living expenses such as food, lodging, transportation (mileage), lost wages, and emergency medical treatment. There also will be coverage for bodily injury and property damage.

Compensation also will be available for business-related financial losses that result from government-ordered condemnations, embargoes, quarantines, and/or directives to remove equipment or facilities from service because of contamination from radioactivity released by a power plant.

Be sure to document all losses carefully. Within 24 to 48 hours, the utility's liability insurance underwriter will set up local offices in the immediate area to process claims. Public service announcements will provide the locations.

General Information on Radiation

What is radiation?

Radiation is energy emitted in tiny waves or particles. You can't see, hear, or taste radiation. For these reasons, people sometimes think radiation is mysterious or frightening. However, we know a great deal about radiation.

Heat, light, and radio waves are types of radiation. The atom, the basic building block of the universe, is the universal source of radiation. All things are made of atoms.

All atoms are made of even smaller particles: protons, electrons, and neutrons. These particles are joined tightly together. Any time this bond is broken, energy is released. This energy is radiation.

Radiation sometimes produces charged particles in material it strikes. Charged particles are known as ions. This is the type of radiation we are discussing in this brochure. Ionizing radiation can produce charged particles in all matter.

What does ionizing radiation do to the body?

A small amount of radiation entering the body might occasionally cause cell damage, which the body can repair as it would any other cell damage.

What are the hazards of ingesting radioactivity?

Radioactivity in foodstuffs may enter organs and/or tissues, such as the thyroid gland, muscle, and bones. Some will leave the body rather quickly while some will remain for a considerable time. As long as the radioactivity remains in the body, it will irradiate tissue around it. This radiation can increase the risk of developing cancer or producing a genetic change.

Not all radiation exposures result in cancer or genetic change. Cells may repair themselves if exposures are low or infrequent. The chance of undesirable effects increases the higher the amount of radioactivity consumed and the longer it remains in the body.

How much radiation exposure is dangerous?

Radiation exposure is measured in millirems. A millirem is a unit used to measure biological effects of radiation. Although radiation may cause cancer at high doses and high dose rates, public health data do not unequivocally establish the occurrence of cancer following exposure to low doses and dose rates below about 10,000 mrem (Source: U.S. Nuclear Commission "Frequently Asked Questions About Radiation Protection," 2004.) However, to lessen the risk of long-term effects, federal limits are a fraction of this level. It is assumed the risk of long-term effects is small at lower doses and dose rates.

To put millirem into perspective, let's look at a chart that shows sources and amounts of radiation received by humans every day.

Typical Annual Radiation Exposure	
Natural Background Radiation	Millirem per year
Cosmic rays from the sun	26
Radiation from the ground	28
Internal radioactivity in our bodies (from food and water)	39
Radon gas (air we breathe)	201
Human-made Radiation	Millirem per year
Medical and dental X-rays	53
Air Travel	1
Living within 50 miles of a nuclear power plant	0.05
Other (fallout, occupational exposure, etc.)	10
Total Average Exposure	360

Source: National Council on Radiation Protection Measurements
NCRP-93 Tables 24 and 5.1

Concerns Regarding Food and Water Supplies

Depending on the amount of radioactive materials released into the atmosphere and the prevailing weather conditions, people, animals, crops, land, water, food, and food products near the nuclear power plant could be affected.

The initial concern is the contamination of fresh milk from dairy animals grazing on pasture and drinking from open sources of water. Sampling for contamination could occur at the farm, the transfer station, or the processing plant. If contamination of fresh milk and processed milk products is verified, state or local government officials will determine whether to dispose of these products or to hold them until they are safe for consumption.

Also of concern is the condition of food and food products. Government officials may withhold (embargo) contaminated food products from the marketplace. These products will not be released until state or local officials consider them safe for consumption, or until a decision is made to dispose of them.

A delayed concern is the possible contamination of vegetables, grains, fruits, and nuts. The severity of the impact of the contamination depends on the time of year the emergency occurs. The time immediately prior to or during harvest is the most critical period. The appropriate government officials will sample and analyze crops to ensure they are safe to eat.

An additional concern is the possible impact of the contamination on livestock and poultry. To ensure that meat and poultry products are safe to eat, officials will take and analyze samples of pasture, feed, and water sources, and meat and poultry products.

Contamination of drinking water supplies is not likely to be significant. If it occurs, it probably will affect only surface water supplies and not ground wells or underground water sources. The safety of water will be determined by sampling public and private sources.

If land becomes contaminated, proper soil management techniques can be implemented to reduce contamination of crops grown on the land. The procedures recommended depend on the severity of contamination and the specific crops to be grown.

In conclusion, radiation exposure to the public will be minimal when controls are applied to the above concerns.

Where Can You Get More Information?

For further information on harvesting, storing, and decontaminating your pasture and crops, contact your local emergency management office. If you need more detailed information or additional copies of the brochure, call the Minnesota Department of Agriculture at 651-201-6640 or the State of Minnesota Hotline at 800-657-3504 or 651-297-1304.

**Monticello Nuclear Generating Plant
50-mile Ingestion Pathway Counties**

County	Emergency Mgmt. Office
Anoka	763-323-5761
Benton	320-968-8105
Carver	952-361-1527
Chisago	651-674-5725
Dakota	651-438-4703
Hennepin	612-596-0252
Isanti	763-689-3591
Kanabec	320-679-6380
Kandiyohi	320-235-5133
McCleod	320-864-1339
Meeker	320-693-5420
Mille Lacs	320-983-8250
Morrison	320-632-0195
Pine	320-216-4252
Ramsey	651-266-1020
Renville	320-523-3838
Scott	952-496-8381
Sherburne	763-241-4560
Sibley	507-237-4124
Stearns	320-259-3940
Washington	651-430-7621
Wright	763-682-7326

**Prairie Island Nuclear Generating Plant
50-mile Ingestion Pathway Counties**

County	Emergency Mgmt. Office
Anoka	763-323-5761
Carver	952-361-1527
Chisago.....	651-674-5725
Dakota	651-438-6132
Dodge.....	507-635-2639
Goodhue.....	651-267-2640
Hennepin.....	612-596-0252
Le Sueur.....	507-388-5302
Olmstead.....	507-287-7811
Ramsey	651-266-1020
Rice	507-332-6119
Scott.....	952-496-8381
Steele	507-444-2454
Wabasha.....	651-565-3069
Waseca.....	507-835-0690
Washington	651-430-7621
Winona	507-457-6351



We recommend that you keep this brochure in a convenient location where you can refer to it quickly if necessary.

The Office of Emergency Planning, Food Safety and Inspection Service, U.S. Department of Agriculture (USDA), provided guidance in preparing this publication. This office is responsible for the U.S. Department of Agriculture Radiological Response Plan for managing the USDA response if a radiological accident occurs.

The Federal Emergency Management Agency in consultation with selected members of the Federal Radiological Preparedness Coordinating Committee provided additional guidance.

The Minnesota Departments of Agriculture, Health, Public Safety, and Natural Resources gave further guidance for revising and editing this brochure.

Emergency Instructions

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