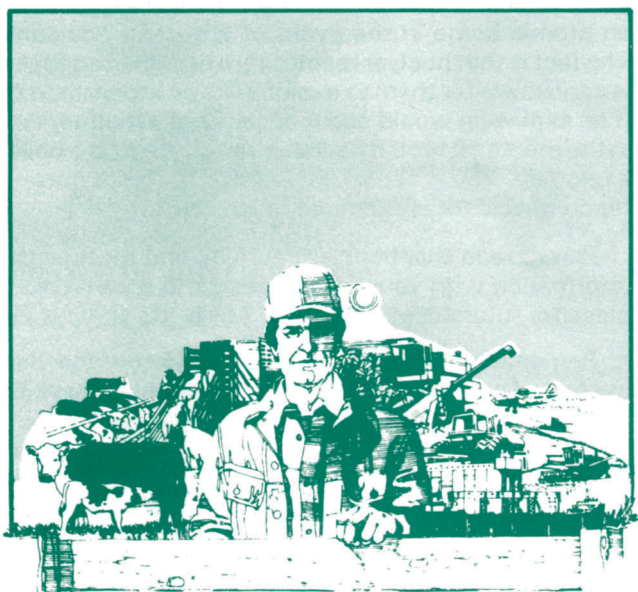


Farmers Emergency Information

**WHAT YOU SHOULD
KNOW ABOUT
NUCLEAR POWER
PLANT INCIDENTS**



**Pennsylvania Department
of Agriculture**



Dear Farmer,

This booklet contains general information on the needs and care of animals and specific information on what you may be asked to do if an incident should occur.

The protective actions outlined in this booklet are supported by state, county and municipal emergency plans.

The likelihood of a serious accident at a nuclear power plant is small, but it can happen. A popular misconception is that a nuclear reactor could explode like an atomic bomb in the event of a nuclear accident. The fact is that nuclear reactors are designed so that it is impossible for them to explode like an atomic bomb. If an explosion would occur because of a malfunction in the reactor, it would have the same effect as a boiler exploding. The most probable hazard from a nuclear reactor accident is exposure to ionizing radiation.

Please read this booklet carefully and discuss the information with your family. Keep it in a convenient place for future use.

Remember, it is important that you know the alert system. If an emergency occurs, turn your radio or TV on and respond quickly but calmly.

Secretary of Agriculture
Commonwealth of Pennsylvania

PURPOSE OF THIS BOOKLET

This booklet provides information for farmers and livestock owners on how to protect livestock and poultry should a nuclear power plant incident occur. It supplements the emergency information given in "What You Should Know About Nuclear Power Plant Incidents," developed by the Commonwealth of Pennsylvania for people living near nuclear power plants. This booklet also supplements information supplied by the county Emergency Management Agency (EMA).



WHAT IS A NUCLEAR POWER PLANT INCIDENT?

The most frequently thought of nuclear power plant incident is the abnormal release of radioactive material by a nuclear power plant. But a nuclear power plant incident may not involve an active release of radiation.

Nuclear radiation is energy in the form of invisible particles or rays that are given off by radioactive materials. There are three general types of radiation: Alpha particles, Beta particles and Gamma Rays. Alpha particles offer little hazard unless the radioactive material is ingested or inhaled. Beta particles have a low penetration ability and are stopped by things such as a layer of skin, a sheet of plastic or a piece of wood. Gamma rays are identical to X-rays and can easily penetrate low density materials. The radioactive materials having the greatest impact on agriculture are the radioiodines. Radioactive iodine is important because of its abundance in a reactor and its affinity for the pasture-cow-milk-food chain.

Accidents not requiring protective action by the general public may still require removal of dairy cattle and/or feed from the contaminated area.

HOW IS RADIATION DETECTED?

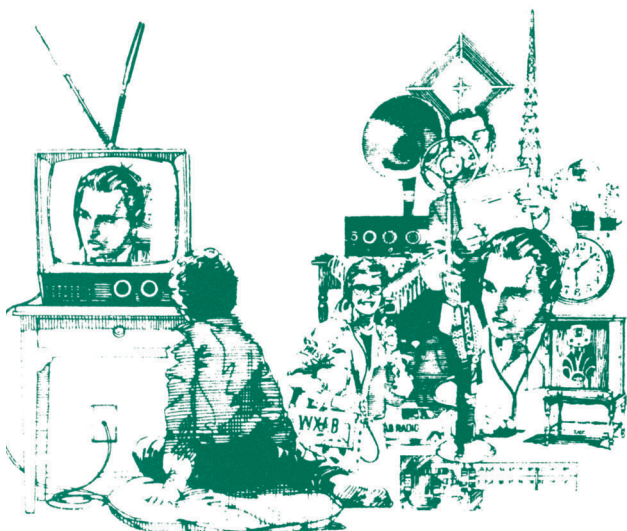
Radiation cannot be detected through any human senses, but it can be detected by special instruments. Experts use these instruments to continually monitor radiation levels around nuclear power plants. If a nuclear incident does occur, monitoring will be increased and accurate information will be gathered for potentially affected areas.

The amount of radiation in an area is measured by radiation dose, called a Rem. The Rem, based on effects of radiation on the human body, is essentially the same as the unit measurement for X-rays. Millirem, commonly heard, is one-thousandth (1/1000) of a Rem.

HOW WILL YOU LEARN OF A NUCLEAR INCIDENT?

If protective measures are required, the standard "Alert Signal" will be sounded over a siren system installed within a ten-mile radius of all nuclear power plants. The "Alert Signal" is a steady three to five minute tone—not a wailing or warbling sound. The "Alert Signal" means people within hearing distance should tune to their local TV or Radio Emergency Alert Station. A message will be broadcast advising the action to be taken. To make sure everyone "gets the word," the emergency alert message will be repeated frequently. State and or local municipal police, fire departments and other agencies will carry the message. Sound trucks, bull horns and door to door contacts will be made.

REMEMBER: If the "Alert Signal" is heard, **TURN ON YOUR RADIO OR TV.**



HOW WILL I KNOW WHAT TO DO?

Each county EMA has established a "Contact and Dosimetry KI Distribution Point for Farmers," at a location easily accessible and known. At the time of the emergency, Emergency Alert System (EAS) announcements will direct farmers to report to the designated location. At the location, farmers will receive dosimeters, potassium iodide (KI) and a "Pass," enabling them to exit and re-enter the contaminated area. A dosimeter is a pen or card shaped device used to measure accumulated radiation exposure. Potassium iodide (KI) is a drug that offers some protection to the thyroid gland from injury due to an accumulation of radioactive iodide. The "pass" will consist of a "Farmer Emergency Worker Certification" form filled out by each farmer. The original serves as his "pass."

Farmers will also be given information at the distribution point on the use of dosimeters, what the readings mean, what the KI is for and, how and when to use it. Any questions will be answered at the distribution point.

Farmers should be aware of the Food and Drug Administration's (FDA) protective action guidelines. These are not regulations, but are recommended guidelines for farmers and emergency workers. According to the guidelines, projected radiation dosage should not exceed 5 Rem for the whole body. Dosimeters and calculations are used to determine the radiation dose. Farmers will receive help at the distribution point on their calculations.

Emergency workers from the Pennsylvania Department of Agriculture will be available to collect field samples of milk, livestock forage, feed, and water for laboratory analysis. Contamination levels and appropriate health related advisories will be issued.

WHAT PROTECTIVE ACTIONS CAN BE TAKEN?

There are two simple and effective steps that can be taken in a nuclear power plant incident. The appropriate action will be advised to farmers over the Emergency Alert System.

One step is taking cover or shelter; go indoors. Take shelter is the action usually taken if a small puff of radiation rises from a nuclear plant and moves swiftly away. Farmers hearing a "Take Shelter" advisory should take shelter themselves and if time permits, shelter animals and provide uncontaminated feed and water.

Another step is evacuation. Evacuation is considered to be the normal protective action in Pennsylvania. Evacuation is recommended if there is a possibility of, or if large amounts of radiation have escaped from the plant. Farmers hearing an "Evacuation" advisory should shelter their animals if enough advance warning is given. Sheltering gives some protection from airborne radioactive particles and makes it easier to supply feed and water without contamination.

Farmers affected by a "Take Shelter" or "Evacuation" advisory should contact their county Emergency Management Agency (EMA) as directed by the Emergency Alert System (EAS).

The basic objective of protective actions is to reduce the amount of radiation received by the farmer and his livestock. Farm operators near a nuclear power plant should take advantage of all their resources, plan ahead for adequate livestock shelter, ventilation and protection of feed and water. Poor ventilation or lack of water can harm animals just as readily, if not more so, than radiation.

WHAT TYPE OF SHELTER SHOULD BE USED?

Sheltered animals are protected from potentially contaminated air and radioactive materials which are deposited as the radioactive cloud passes. Livestock housed in farm buildings can receive some protection from direct radiation exposure.

Plan ahead for shelter by deciding which buildings offer the greatest protection. Barns, milking parlors, machine sheds, garages, corn cribs and swine or poultry buildings are all possible livestock shelters. Some buildings offer greater protection than others depending on their construction:

| PROTECTION OFFERED BY COMMON FARM BUILDINGS | |
|--|--|
| Percent of outside radiation received by animals inside the building | Type of Building |
| 5-10 | Large barns, concrete or masonry |
| 20 | Multi-story poultry houses, masonry |
| 20-40 | Large frame buildings |
| 20-40 | Full masonry or concrete block hoghouse |
| 30-50 | Conventional frame barns |
| 30-90 | Other poultry houses |
| 50 | Conventional hoghouse (part concrete) |
| 60-80 | Pole barns, loafing sheds, stock confined under roof |

HOW MUCH SPACE IS REQUIRED IN THE SHELTER?

Decide how many animals need shelter and determine priorities for sheltering stock. Providing shelter and care for all livestock is usually impractical and impossible. Plan to give dairy cows and best breeding stock the most protected areas. If an evacuation is called and there is time, place the calves, especially newborns, with valuable lactating cows. Try to milk all cows BEFORE evacuating. The following chart can help determine space requirements.

| SPACE REQUIREMENTS FOR LIVESTOCK IN CLOSED BUILDINGS | |
|---|--------------------------|
| Dairy Cows | Cow in Production |
| 20 cows or less . . . | .30 square feet |
| 21 cows or more . . . | .50 square feet |
| 5 cows or less | .20 square feet |
| calves up to 6 months | 15-20 square feet |
| calves 6 months to 1 year | 20-30 square feet |
| Dry Cow | Weaning Calves |
| Beef Cows | |
| Beef cow with calf | 150 square feet |
| Beef cow dry | .50 square feet |
| Weaning calves | |
| calves up to 6 months | 15-25 square feet |
| calves 6 months to 1 year | 20-30 square feet |
| Sheep | |
| Ewe with lamb | .32 square feet |
| Ewe, dry | .16 square feet |
| Weaning lamb | .16 square feet |
| Swine | |
| Brood sow with litter | .40 square feet |
| Brood sow, dry | .15 square feet |
| Weaning pigs | .10 square feet |
| Fattening hogs | |
| 100 pounds | .4 square feet |
| 200 pounds | .6 square feet |
| Poultry | |
| Laying hens | .2 square feet per bird |
| Broilers | .6 square feet per bird |
| Turkeys | .4 square feet per bird |

WHAT ABOUT VENTILATION?

A primary limiting factor in sheltering livestock is ventilation. Listen to your Emergency Alert System (EAS) announcements to obtain information on radiation exposure conditions.

Livestock confined in a roofed building and being fed uncontaminated feed and water will still be exposed to radiation from contaminated air entering the building. Therefore, outside air entering the building should be kept to a minimum.

DO NOT USE FANS FOR VENTILATION. If you must, plan to set them on low speed to reduce the air intake.

RECOMMENDED VENTILATION IN ANIMAL SHELTERS

| Animal | Cubic Feet Minute/ Animal Winter | Cubic Feet minute/ Animal Summer |
|-----------------|---|---|
| Cattle | | |
| 400 pound calf | 30 | 80 |
| 800 pound dairy | 70 | 200 |
| 1000 pound | 100 | 225 |
| 1600 pound | 130 | 300 |
| Hen | 1/2 | 6 |
| Sheep | | |
| Nursing Ewe | 10 | 30 |
| 60 pound lamb | 7 | 20 |
| Swine | | |
| Sow and litter | 50 | 100 |
| 100 pound hog | 15 | 40 |
| 200 pound hog | 25 | 75 |

Ventilation needs are the judgement of the herds-men. Remember, it is better to have some radioactive contamination than losses from overcrowding, heat and poor ventilation.

WHAT ABOUT FEED AND WATER FOR ANIMALS?

Plan to protect feed and water from radioactive contaminants. If animals ingest contaminated feed and water, they will be exposed to internal radiation. Give animals uncontaminated feed and water until questionable samples have been analyzed and determined safe.

Feed stored in buildings is protected from contamination. Feed stored outside can be protected by placing plastic or canvas covering over it as soon as warning of an incident is heard.

The animals' most crucial need is safe water, even more so than feed. Water from a covered or deep well or running spring is safe for livestock.

Livestock care and maintenance may not be possible for the first 48 hours after an evacuation advisory.

For this reason, the farmer should plan to provide a minimum emergency supply of water and withhold feed until care is possible. The lack of feed will help reduce the need for water. Decreased water intake will help reduce milk flow.

After the first 48 hours or more, feed livestock one-half their normal feed for a day; gradually increase the amount by one pound a day per animal until they are back to their normal rations.

Animals can survive on the following minimum rations and water for several months. Additional protein will be needed to build tissues.

| DAIRY COWS | WATER/DAY | FEED/DAY |
|------------------------|---------------------------------------|-------------------------------|
| In Production | 9 gallons summer 7½ gallons winter | 20 pounds hay |
| Dry cows | 9 gallons summer 7½ gallons winter | 20 pounds hay |
| Weaning calves | 6 gallons summer 3 gallons winter | 8-12 pounds hay |
| Cow (pregnant) | 7 gallons summer 6 gallons winter | 10-15 pounds of legume hay |
| Cow with calf | 9 gallons summer 8 gallons winter | 12-18 pounds of legume hay |
| Calf (400 pounds) | 6 gallons summer 4 gallons winter | 8-12 pounds of legume hay |
| Swine | | |
| Brood sow with litter | 4 gallons summer 3 gallons winter | 8 pounds grain |
| Brood sow (pregnant) | 1-2 gallons summer 1 gallon winter | 2 pounds grain |
| 150 pound gilt or boar | 1 gallon | 3 pounds grain |
| Sheep | | |
| Ewe with lamb | 4 quarts | 5 pounds hay |
| Ewe, dry | 3 quarts | 3 pounds hay |
| Weaning lamb | 2 quarts | 3 pounds hay |
| Poultry | | |
| Layers | 5 gallons/100 birds | 17 lbs/100 birds |
| Broilers | 5 gallons/100 birds | 10 lbs/100 birds |
| Turkeys | 12 gallons/100 birds | 40 lbs/100 birds |

Farmers should make plans to protect their animals BEFORE an actual nuclear power plant emergency occurs. Farmers are advised to gather as much information as possible to determine the best method for protecting livestock should an incident occur.



WHAT ABOUT CROPS & FOOD?

Protective actions for crops, fresh fruits and vegetables and other food products depend on when the contamination occurs as well as the type of crop.

Contamination just before or during harvest time requires washing or peeling of fresh fruits and most vegetables before consumption. Root vegetables are protected by the soil. Wait to harvest them until determined safe by authorities.

Contamination of field crops at harvest time can be minimized through storage. Radioactive decay will reduce contamination of field crops with time.

Other foods may also be canned or frozen to allow time for radioactive decay.



At other periods in the growing cycle, effects of contamination should be limited depending on the length of time before harvest.

Further information on protective actions for crops and food products will be available through the Emergency Alert System (EAS).

SUMMARY

The basic principals of protecting livestock (and people) against radiation are easy to apply. The objective is to reduce the total exposure to radiation.

IF AN ACCIDENT OCCURS:

Siren alert systems will signal the public in the vicinity of a nuclear reactor that a problem has occurred. Turn on your radio or television for more information.

Emergency Alert System announcements (radio and/or television) will provide instructions or directions to the public. Public information statements will be issued over the same system.

Two primary protection action options for the general public are sheltering and evacuation. It is important that you respond quickly but calmly when notified that any protective action should be taken.

Lactating dairy cows should be removed from pasture to protect milk supply. Animals should be given uncontaminated feed and water. Feed stored in buildings is protected from contamination. Water from a covered well or running spring is safe for animals.

Sheltered animals receive some protection from radiation exposure.

A limiting factor in protecting livestock is ventilation. It is better to have some radioactive contamination than losses from over crowding, heat and poor ventilation.

Milk and other food products produced in the area of contamination will be tested by an appropriate agency. Their advice should be followed.

Farmers affected by an "Evacuation" advisory should contact their county Emergency Management Agency to receive instructions, approval and necessary equipment to enter the restricted area.

Good judgement and a cool head will be helpful in protecting the Agricultural Community in the event of a nuclear reactor accident.



