

Radiological Emergency Information

For Farmers, Dairy Farmers, Ranchers,
Food Processors, and Distributors



Important Information • Keep this Booklet

**For more information or copies,
write or call any of the listed agencies:**

Arizona Radiation Regulatory Agency

4814 South 40th Street
Phoenix, AZ 85040
602 255 4845

Arizona Department of Agriculture

1688 West Adams,
Phoenix, AZ 85007
602 542 4373

Arizona Department of Health Services

1740 West Adams
Phoenix, AZ 85007
602 542 1000

Arizona Division of Emergency Management

5636 East McDowell Road
Phoenix, AZ 85008
602 244 0504

Arizona Game and Fish Department

2222 West Greenway Road
Phoenix, AZ 85023-4399
602 942 3000

Maricopa County Department of Emergency Management

5630 East McDowell Road
Phoenix, AZ 85008
602 273 1411

Maricopa County Cooperative Extension

4341 East Broadway
Phoenix, AZ 85040
602 255 4456

Palo Verde Nuclear Generating Station

Post Office Box 52034, Station 6050
Phoenix, AZ 85072-2034
623 393 6128

Radiological Emergency Information

**FOR FARMERS, DAIRY FARMERS, RANCHERS,
FOOD PROCESSORS AND DISTRIBUTORS**

**Prepared by the State of Arizona,
Division of Emergency Management**

In consultation with:

- Arizona Radiation Regulatory Agency
- Arizona Department of Agriculture
- Arizona Department of Health Services
- Arizona Game and Fish Department
- Maricopa County Department of
Emergency Management
- Maricopa County Cooperative Extension
- Palo Verde Nuclear Generating Station

2012

Important Information

Please Read and Save this Book

What to Do in a Radiological Emergency

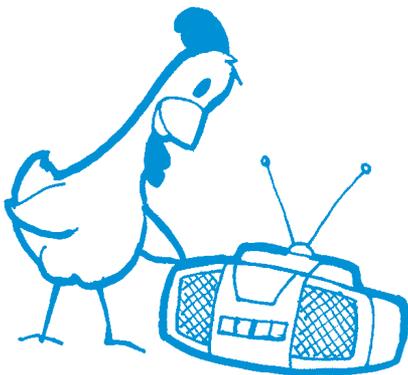
A Summary of Recommendations

While it is unlikely that a serious radiological emergency will ever occur at the Palo Verde Nuclear Generating Station (PVNGS), it is important that we be prepared for such an event. The information in this brochure may help you to more effectively understand and respond to such an emergency.

If a serious radiological emergency occurs at the PVNGS and your farm is within ten miles of the plant, you will be alerted by the sounding of a siren, an emergency vehicle equipped with a loudspeaker, a tone alert radio, or other appropriate means. You should take the following actions:

- Turn on your radio or television and tune it to a station or channel that carries Emergency Alert System (EAS) information or listen to the message on your tone alert radio. You may verify the EAS stations/channels that broadcast emergency information to your area by calling local emergency officials or your local radio and television stations.

If your farm is located in the 10-50 mile area around the Palo Verde Nuclear Generating Station, you should also follow the above instructions and tune to a station or channel that carries Emergency Alert System information for any specific instructions for your area.



The Primary EAS Stations in the Area Are:

- Radio Station **KTAR 620AM**
- Television Station **KPNX Channel 12**
- Follow the directions of the State or local emergency response officials as provided by the above sources. You **MAY** be advised to take protective actions such as:
- Protect feed and water. 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 water.
- If you live within ten miles of the Palo Verde Nuclear Generating Station, you may be advised to take shelter (go inside) or to evacuate. (This would help protect you and your family from potentially harmful exposures to radiation).

If a release of radioactive materials occurs, normal health practices should be followed; however, be extra thorough in washing hands before preparing or eating food. Also, wash, scrub, peel or shell all fresh fruits and vegetables before eating them.

If contamination of agriculture products is verified by appropriate State and local government officials, you MAY be advised to take the following types of actions:

- Wash hands thoroughly before preparing or eating food.
- Wash, scrub, peel, or shell fresh fruits and vegetables before eating them.
- Remove dairy animals from pasture, shelter if possible, and provide them with protected feed and water.
- 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 they have been sampled by appropriate government officials and found to be free of contamination.
- Do not transport or market contaminated food products.
- Do not eat wildlife or fish taken from within a 50 mile radius of the Palo Verde Nuclear Generating Station until a determination is made as to the extent of the emergency. (Specific instructions will depend on the distance of your farm or facility from the Palo Verde Nuclear Generating Station and the prevailing wind conditions.)

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Introduction

This brochure provides emergency information for the agricultural community within a 50-mile radius of the Palo Verde Nuclear Generating Station. It contains information concerning how you will be notified and what procedures you should follow in the unlikely event of a radiological emergency at the nuclear generating station.

If an emergency results in a release of radioactive material to the environment, you may be advised to take actions to protect your family, farm animals, and agricultural products. This information, along with specific instructions you will receive over the Emergency Alert System (EAS) or through other official media statements, will help you to prevent or minimize the effects of a radiological emergency on food and agriculture.

The instructions in this brochure may also be used in response to other kinds of radiological emergencies. General information on radiation and post emergency activities is provided at the end.

Please Read This Brochure Thoroughly

Sources of Emergency Information

In the event of an emergency at the Palo Verde Nuclear Generating Station, specific protective action recommendations will be issued by appropriate State or local government officials. Information to prevent or minimize radiation contamination of food products will be provided to you through at least one of the sources listed below:

- The Emergency Alert System (EAS) will provide you with emergency information over designated radio and television stations. These stations will also provide additional emergency-related information.
- National Oceanic and Atmospheric Administration (NOAA) weather radio broadcasts over tone alert radios will provide you with up-to-date weather information. The broadcasts may also provide you with emergency instructions on protective measures.
- Additional emergency agricultural information will be available to you through State or local government emergency organizations.

Emergency Planning Zones and Protective Actions

Two types of emergency planning zones may be referred to in an emergency. Visit azien.gov.

The Plume Exposure Pathway

This is the area within a 10-mile radius around a commercial nuclear generating station in which emergency actions may be necessary to prevent direct radiation exposure to people. (See Centerfold Map)

The Post-Plume-Phase or Ingestion Exposure Pathway

This is the area within a 50-mile radius around a commercial nuclear generating station in which emergency actions may be necessary to prevent the marketing of contaminated food, milk, and water. (See Centerfold Map)

The safety of the food supply within the 50-mile Ingestion Exposure Planning Zone could be a concern to members of the agricultural community if a radiological release to the atmosphere occurred. During such a release, both water and land could become contaminated.

Eating contaminated foods and drinking contaminated milk and water could have a harmful, long-term effect on your health. State and local government emergency response organizations are prepared to quickly notify and advise the agricultural community on what actions to take in the event of a radiological emergency. The decision to recommend protective actions will be based on the emergency conditions at the nuclear generating station, available information on the amount of radiation that has been released to the environment, and consideration of the health, economic, and social impact of the proposed actions.

Protective Actions for the Human Food Supply

The following are examples of protective actions and related information that may be recommended to the agricultural community by appropriate State or local government officials. Location-specific protective action recommendations will be issued by these officials in the event of an actual emergency.

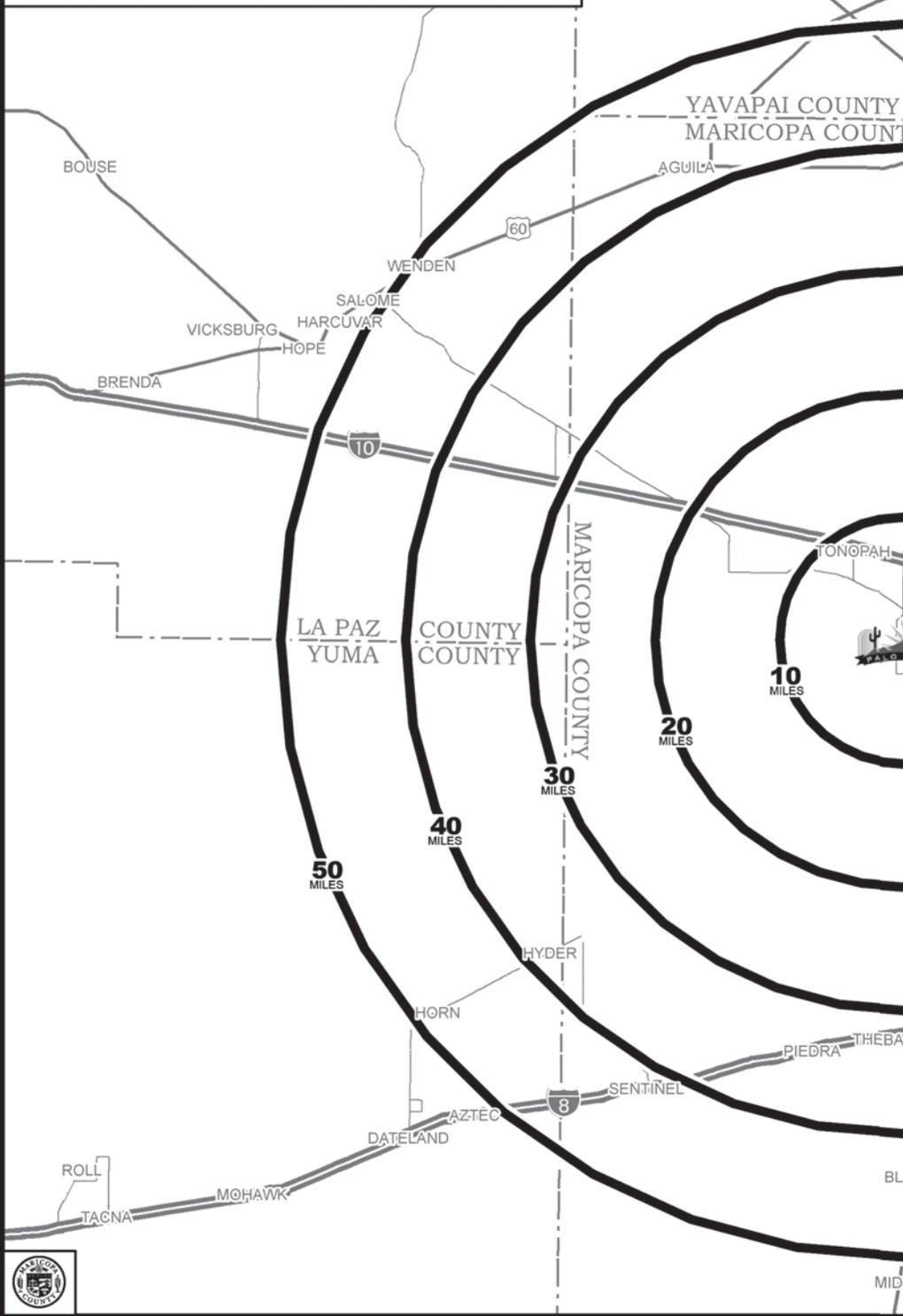
Milk

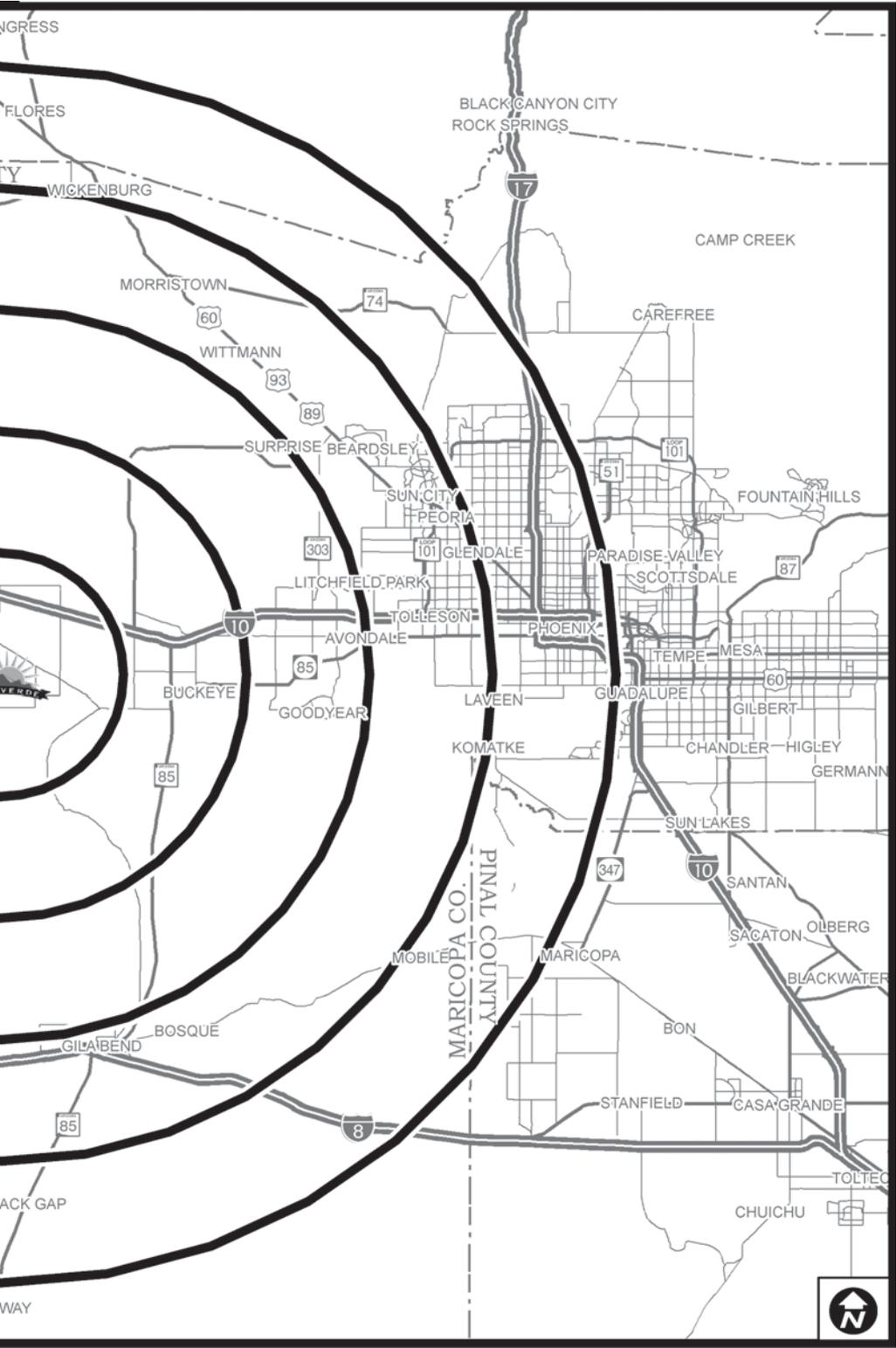
Remove all dairy animals from pasture, shelter if possible, and provide them with protected feed and water. Representatives of the State or local government may come to your farm to take milk, feed, and water samples for laboratory analysis to determine whether any of these products are contaminated. You may be told to put your animals, especially dairy animals, on protected or stored feed and water. Grain stored in a permanent bin, hay in a barn or ensilage in a covered silo can be considered protected. A haystack in an open field can be protected



with a tarpaulin or similar covering, but this must be done before any radioactive material passes over your area. Large bales of hay stored outside should not be used unless absolutely necessary. Even then, they should be used only when the outer layers have been removed and discarded. If no protected or stored feed is available for use during an emergency, animals could survive for a time on water alone.

FIFTY MILE EMERGENCY PLANNING ZONE MAP





GRESS

FLORES

WICKENBURG

MORRISTOWN

60

WITTMANN

93

89

SURPRISE BEARDSLEY

SUN CITY PEORIA

303

101 GLENDALE

PARADISE VALLEY SCOTTSDALE

87

10

85

BUCKEYE

GOODYEAR

LAVEN

GUADALUPE

GILBERT

CHANDLER HIGLEY

GERMANN

85

KOMATKE

SUN LAKES

10

SANTAN

SACATON

OLBERG

BLACKWATER

BON

MOBILE

MARICOPA

STANFIELD

CASA GRANDE

ACK GAP

8



If dairy products are found to be contaminated, it may be recommended that milk and milk products be withheld from the market. It is possible, however, for milk products contaminated with certain radioactive materials to be safe for human consumption after proper storage over a period of time. This will allow for decay of the radioactive materials. The necessary decay period may be achieved by freezing and storing fresh milk, concentrated milk, or concentrated milk products. Storage of milk for prolonged periods of time at reduced temperature is also possible provided ultrahigh temperature pasteurization techniques are used during processing.

You will be advised by State or local government officials as to what protective actions are appropriate.

Fruits and Vegetables

Wash, scrub, peel or shell locally grown fruits and vegetables, including roots and tubers, to remove surface contamination. Remove the outer leaves of leafy vegetables such as lettuce and cabbage. If produce is contaminated by short-lived radionuclides (e.g., Iodine 131), preserve by canning, freezing or dehydration and store to allow time for the radioactivity to decay.

You will be advised by State officials when it is safe to consume produce so preserved.

Soils

If State or local government officials find that the soil is contaminated, proper soil management procedures can be implemented to reduce contamination to safe levels. Idling, the nonuse of the land for a specific period of time, may be necessary in some cases. However, in situations involving highly contaminated soil, removal and disposal of the soil may be more appropriate. In the event of soil contamination, crops not intended for human or livestock consumption would be recommended as an alternative. Deep-plowing the soil will remove radioactive substances below the plant root level, prevent plants from taking up contaminated nutrients, and allow the level of radioactivity to decrease with the passage of time.

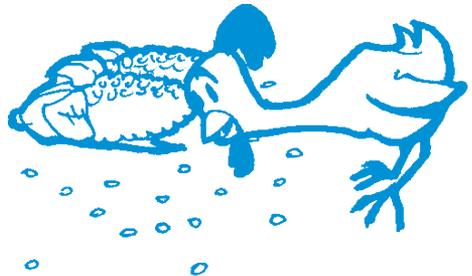
State or local government officials will let you know what actions are appropriate.

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. Poultry raised indoors and given protected feed and water are less likely to be contaminated. If contamination is verified, State or local government officials may advise that poultry and eggs should not be eaten.

Meat and Meat Products

Livestock exposed to external contamination could be used for food if they are adequately washed and monitored by the State officials before slaughtering. Animals can be washed down using soap and water. In handling animals, you



should wear protective clothing to prevent contaminating yourself. Meat animals that consume contaminated feed should not be slaughtered until you are told by State authorities that it is safe to do so. Instructions would be given on a case by case basis.

Fish and Wildlife

Fish and wildlife within 50-mile radius of the Palo Verde Nuclear Generating Station should not be taken and consumed until determinations can be made as to the extent of contamination, appropriate precautions, and preventive actions. Wildlife and fish could become more contaminated than domestic livestock because of the potential for unrestricted access to contaminated food and water sources. Location-specific protective actions will be used by the appropriate government officials in the event of an actual emergency.

Grains

If grains are permitted to grow to maturity, most contamination will probably be removed by the wind and rain. Milling or polishing will probably remove any remaining contamination. Sampling and laboratory analysis will determine if the grain is safe to use. When harvested, contaminated and uncontaminated grains should be stored separately.

Water

Open sources of water should be protected. Cover open ponds and tanks to prevent contamination. Covered wells and other covered or underground sources of water will probably not become contaminated. Radiation contaminants deposited on the ground will travel slowly unless soils are sandy. It is unlikely that underground water supplies

will be affected. Close water intake valves

from any contaminated water

sources to prevent distribution

(e.g., irrigation) of contaminated

water. Contaminated dust may

accumulate in exposed irrigation

canals. If possible, run a small

amount of water through your

canal system, and divert this water

away from your crops before

resuming your normal irrigation

practices. Filler pipes should be

disconnected from storage containers

that are supplied by runoff from roofs

or other surface drain fields. This will prevent

contaminants from entering the storage containers.



Protective Actions for the Animal Food Supply

Hay

Stacks of hay and forage should be covered with a tarpaulin; use the hay on the side away from the wind direction first. When bales of hay stacked in the open must be used, remove the outer layer of the bales and use those remaining. Do not use the outer bales until they have been sampled, analyzed and cleared by State authorities.

Feed

Feed stored in open bins or bags in the open should be covered with a tarpaulin.

Water

Animal water troughs should be covered if possible. If not, after the passage of any plume of radioactive material, troughs should be drained, flushed thoroughly, and refilled.

Honey

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

Food Processors and Distributors

Radioactive contamination of milk or food products in an affected area can occur during processing or during transportation. This can result from exposure to radioactive materials on the ground or in the air, and from contact with contaminated products. Following a radiological emergency, government officials may restrict the movement of food products and withhold them from the marketplace if they are found to be contaminated. These products should not be released until they are considered to be safe for consumption, or until a decision is made to dispose of them. You will be instructed how to safely handle and dispose of contaminated food products.

Post Emergency Actions

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

Reentry

Reentry is the temporary entry, under controlled conditions, into a restricted, contaminated area, in all probability within a ten-mile radius of the commercial nuclear generating 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 officials will advise you through 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 animals.

Return

Return is the process of reducing radiation in the environment to accept able levels for normal daily living. Following the emergency, State and local government officials will identify the types and levels of contamination. They may need to 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 and local government officials will determine whether condemnation and disposal are appropriate.

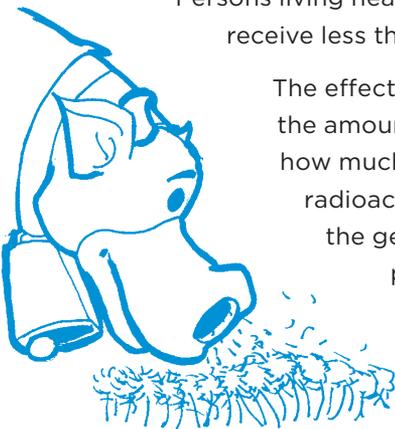
General Information on Radiation

Radiation and radioactive materials are a natural part of our environment. They are in the air we breathe, in the food we eat, in the soil, in our homes, and even in our bodies. The level of radiation naturally existing in our environment is called “background radiation.” It may vary greatly from one location to another depending on related factors such as solar radiation, geographical elevation, soil composition, and the presence of radon gases from the soil and building materials. We are also exposed to sources of man-made radiation such as X-ray machines, and color televisions. Commercial nuclear generating stations may release small, non-harmful amounts of radioactive materials to the environment under controlled conditions and during routine operations.

Radiation exposures received from both environmental (natural) and man-made sources of radioactivity are usually measured in units called millirems. The National Council on Radiation Protection and Measurements, a group chartered by Congress to assess and disseminate information about radiation protection, has estimated the average annual exposure in the United States from all sources to be about 360 millirems excluding exposure from tobacco use.

Persons living near a commercial nuclear power station receive less than one additional millirem per year.

The effects of radiation on people depend on the amount and length of time of exposure, how much of the body is exposed, how much radioactive material stays in the body, and the general health and age of the exposed person. The effects of radiation can be decreased by reducing the time the person is exposed and increasing the distance from the source of radiation.



Summary of Effects of Radioactive Deposits on Human Food and Water Supplies

Depending on the amount of radioactive materials released into the atmosphere and the prevailing weather conditions, people, animals, crops, land, and water near the site of the emergency could be affected. Of initial concern would be the condition of fresh milk from dairy animals grazing on pasture and drinking from open sources of water. Sampling for contamination could occur at the farm or 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 hold them until safe for consumption.

A later concern would be the possible contamination of vegetables, grains, fruits, and nuts. The severity of the impact of the contamination would depend on the time of the year the emergency occurred. The time immediately prior to or during harvest is the most critical period. Crops will be sampled and analyzed by the appropriate government officials to ensure that they are safe to eat.

An additional concern would be the possible impact of the contamination on livestock and poultry. Pasture, feed, and water sources, as well as meat and poultry products will be sampled and analyzed to ensure that the meat and poultry products are safe to eat.

Contamination of drinking water supplies is not likely to be significant. If it occurs, it will probably affect only surface water sources. The safety of water would 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 would depend on the severity of contamination and the specific crops to be grown.

In conclusion, while it is unlikely that a serious radiological emergency could occur at the Palo Verde Nuclear Generating Station, it is important that we be prepared for such an event. The information in this booklet should help you to more effectively respond to such an emergency.

