Nuclear Power Plants

Nuclear power plants operate in most states in the country and produce about 20 percent of the nation's power. Nearly three million Americans live within 10 miles of an operating nuclear power plant.

Although the construction and operation of these facilities are closely monitored and regulated by the Nuclear Regulatory Commission (NRC), accidents at these plants are possible. An accident could result in dangerous levels of radiation that could affect the health and safety of the public living near the nuclear power plant.

Local and state governments, federal agencies and the electric utilities have emergency response plans in the event of a nuclear power plant incident. The plans define two "emergency planning zones." One covers an area within a ten-mile radius of the plant where it is possible that people could be harmed by direct radiation exposure. The second zone covers a broader area, usually up to a 50-mile radius from the plant, where radioactive materials could contaminate water supplies, food crops and livestock.

Understanding radiation

Radioactive materials are composed of atoms that are unstable. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation.

Each of us is exposed to radiation daily from natural sources, including the sun and earth. Small traces of radiation are present in food and water. Radiation also is released from man-made sources such as x-ray machines, television sets and microwave ovens. Nuclear power plants use the heat generated from nuclear fission in a contained environment to convert water to steam, which powers generators to produce electricity.

Radiation has a cumulative effect. The longer a person is exposed to radiation, the greater the risk. A high exposure to radiation can cause serious illness or death. The potential danger from an accident at a nuclear power plant is exposure to radiation. This exposure could come from the release of radioactive material from the plant into the environment, usually characterized by a plume (cloud-like) formation of radioactive gases and particles. The area the radioactive release may affect is determined by the amount released from the plant, wind direction and speed, and weather conditions. The major hazards to people in the vicinity of the plume are radiation exposure to the body from the cloud and particles deposited on the ground, inhalation of radioactive materials, and ingestion of radioactive materials.

If an accident at a nuclear power plant were to release radiation in your area,

local authorities would activate warning sirens or another approved alerting method. They would also instruct you through the Emergency Alert System (EAS) on local television and radio stations on how to protect yourself.

The three ways to minimize radiation exposure are: distance, shielding and time:

- **Distance.** The more distance between you and the source of the radiation the better. In a serious nuclear power plant accident, local authorities will call for an evacuation to increase the distance between you and the radiation.
- **Shielding.** Like distance, the more heavy, dense material between you and the source of the radiation the better. This is why local authorities could advise you to remain indoors if an accident occurs at a nearby nuclear power plant. In some cases, the walls in your home would be sufficient shielding to protect you.
- **Time.** Most radioactivity loses its strength fairly quickly. In a nuclear power plant accident, local authorities will monitor any release of radiation and determine when the threat has passed.

The three ways to minimize radiation exposure are distance, shielding and time.

What to do before a nuclear power plant emergency

1. Know the terms used to describe a nuclear emergency:
   - **Notification of Unusual Event**—A small problem has occurred at the plant. No radiation leak is expected. Federal, state and county officials will be told right away. No action on your part will be necessary.
   - **Alert**—A small problem has occurred, and small amounts of radiation could leak inside the plant. This will not affect you. You should not have to do anything.
   - **Site Area Emergency**—A more serious problem. Small amounts of radiation could leak from the plant. If necessary, state and county officials will act to assure public safety. Area sirens may be sounded. Listen to your radio or television for safety information.
   - **General Emergency**—The most serious problem. Radiation could leak outside the plant and off the plant site. The sirens will sound. Tune to your local radio or television station for reports. State and county officials will act to protect the public. Be prepared to follow instructions promptly.
2. Learn your community's warning system. Nuclear power plants are required to install sirens and other warning systems (flash warning lights) to cover a ten-mile area around the plant.
   - Find out when the warning systems will be tested next.
   - When tested in your area, determine whether you can hear and/or see sirens and flash warning lights from your home.
3. Obtain public emergency information materials from the power company that operates your local nuclear power plant or your local emergency services office. If you live within 10 miles of the power plant, you should receive these

materials yearly from the power company or your state or local government.

4. Learn the emergency plans for schools, day care centers, nursing homes and other places where members of your household frequent. Learn where people would go in case of evacuation. Stay tuned to your local radio and television stations.

5. Be prepared to evacuate.
   - Prepare an emergency evacuation supply kit (see the "Emergency Planning and Disaster Supplies" chapter).
   - Consider your transportation options. If you do not own or drive a car, ask your local emergency manager about plans for people without private vehicles. (See the "Evacuation" chapter for important details.)

Learn your community's warning system and the emergency plans for schools, day care centers, nursing homes and other places your household frequents.

What to do during a nuclear power plant emergency

1. Listen to the warning. Not all incidents result in the release of radiation. The incident could be contained inside the plant and pose no danger to the public.

2. Stay tuned to local radio or television. Local authorities will provide specific information and instructions.
   - The advice given will depend on the nature of the emergency, how quickly it is evolving and how much radiation, if any, is likely to be released.
   - Local instructions should take precedence over any advice given in this handbook.
   - Review the public information materials you received from the power company or government officials.

3. Evacuate if you are advised to do so.
   - Close and lock doors and windows.
   - Keep car windows and vents closed; use re-circulating air.
   - Listen to radio for evacuation routes and other instructions.
   - See the "Evacuation" chapter for important details.

4. If you are not advised to evacuate, remain indoors.
   - Close doors and windows.
   - Turn off the air conditioner, ventilation fans, furnace and other air intakes.
   - Go to a basement or other underground area if possible.
   - Keep a battery-powered radio with you at all times.

5. Shelter livestock and give them stored feed, if time permits.

6. Do not use the telephone unless absolutely necessary. Lines will be needed for emergency calls.

7. If you suspect exposure, take a thorough shower.
   - Change clothes and shoes.
   - Put exposed clothing in a plastic bag.
   - Seal the bag and place it out of the way.

8. Put food in covered containers or in the refrigerator. Food not previously covered should be washed before being put in containers.

What to do after a nuclear power plant emergency

1. If told to evacuate, do not return home until local authorities say it is safe.
2. If you were advised to stay in your home, do not go outside until local authorities indicate it is safe.
3. Seek medical treatment for any unusual symptoms, like nausea, that may be related to radiation exposure.
4. See the "Shelter" and "Recovering from Disaster" chapters for more information.