Nuclear Power Plant

In the United States, over 100 nuclear reactors supply about 20% of our electricity. Worldwide, over 400 reactors provide 17% of the world's electricity.

Nuclear power plants produce electricity through a heat-generating process known as "fission," in which neutrons split uranium atoms to produce large amounts of energy. This process also creates some hazardous by-products, which are contained within the fuel cladding, the reactor vessel, and the thick concrete and steel walls of the containment building.

Among the radioactive materials found at nuclear power plants you will find enriched uranium, low-level waste, and spent nuclear fuel.

- **Enriched uranium**, in the form of a pellet roughly one-inch-long, serves as the fuel for nuclear power plants; there may be over 100 tons of fuel pellets present in a single reactor. One pellet can generate approximately the same amount of electricity as one ton of coal. Uranium fuel is only mildly radioactive and can be handled safely without shielding, unlike spent fuel, which is extremely radioactive.
- **Low-level radioactive waste** includes items that have become contaminated with radioactive material. This waste typically consists of contaminated protective shoe covers and clothing, wiping rags, mops, filters, reactor water treatment residues, and equipment and tools. Low-level waste is stored at the nuclear power plant until either the radioactivity in the waste decays away, allowing it to be disposed of as ordinary trash, or there is enough waste for shipment to a low-level waste disposal site.
- **Spent nuclear fuel** includes many highly radioactive byproducts of the fission process. The fuel is stored at the nuclear power plant site in specially designed pools resembling large swimming pools or in specially designed dry storage containers. In the pools the water cools the fuel and acts as a radiation shield. The storage containers can also cool the fuel and contain the radiation emitted by the used fuel.

Who is protecting you

State and Local Authorities

State and local authorities maintain off-site emergency response plans, which are closely coordinated with the plant's on-site emergency response plan. They also conduct off-site Radiological Emergency Preparedness exercises at each commercial nuclear power station every two years.

U.S. Nuclear Regulatory Commission (NRC)

NRC issues licenses and policies governing safe operation of nuclear reactors and the commercial use of radioactive materials. NRC also performs inspections and oversees emergency response programs for licensees.

U.S. Environmental Protection Agency (EPA)

In 1989 under the Clean Air Act, EPA published standards limiting radionuclide emissions from all federal and industrial facilities. EPA also sets environmental standards for offsite radiation due to the disposal of spent nuclear fuel and high-level radioactive waste.

Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA)

FEMA evaluates both the state and local off-site emergency response plans and the off-site Radiological Emergency Preparedness exercises that are conducted at each commercial nuclear power station every two years.

U.S. Department of Energy (DOE)

DOE is responsible for the development and implementation of the disposal system for spent nuclear fuel from the nation's nuclear power plants. This activity is totally funded by a tax paid by the users of nuclear-generated electricity.

What you can do to protect yourself

Be Informed

Nuclear power plants are designed and built with public safety as a priority, and the buildings are constructed to contain all the radiation. Emissions of radioactive materials from routine operations of nuclear power plants should not require any protective actions on your part. If you live within 10 miles of a nuclear power plant, however, in the event of an accident or a significant unplanned release you may be instructed to evacuate or shelter-in-place. During such an event you should listen to the radio or television for information and instructions provided by your local emergency management directors and/or your elected officials.

If you live with ten miles of a nuclear power plant, you may be issued potassium iodide (KI) tablets. In the event of a release of radioactive iodine, these tablets can prevent radioactive iodine from concentrating in your thyroid. You should only take KI when instructed to do so by local emergency management directors and/or your elected officials. These tablets only protect you from radioactive iodine and will provide no protection from direct radiation exposure or other airborne radioactivity. You should not take KI if you are allergic to iodine.

Resources

You can explore this radiation source further through the resources at the following URL:
http://www.epa.gov/radtown/nuclear-plant.html#resources

We provide these resources on-line rather than here so we can keep the links up-to-date.