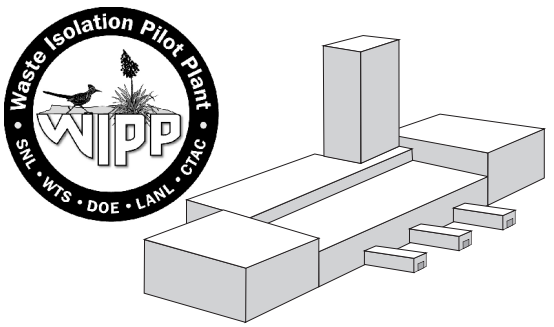
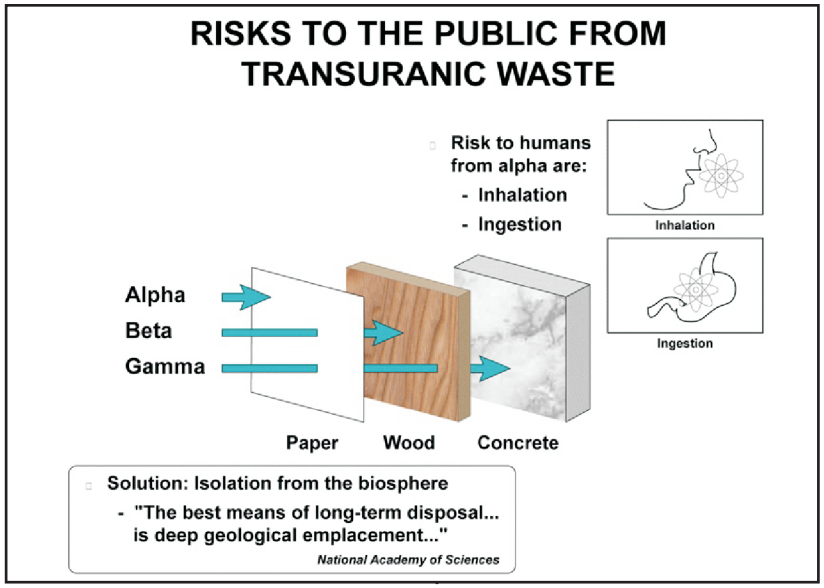


Radiation

Radiation is a natural part of our everyday environment. Cosmic rays showering the Earth through the atmosphere and radon gas seeping up from the soil are only two examples of natural radiation.

Radiation Basics
The study of radiation begins with the atom. Tremendous amounts of energy are stored in an atom's nucleus. When atoms are split, heat and radiation are produced. The heat can be used to turn water into steam and produce electricity.



Radiation is emitted in three forms: alpha particles, beta particles and gamma rays.

The radiation produced from splitting an atom's nucleus is emitted in three forms: alpha particles, beta particles, and gamma rays.

Alpha particles move the slowest. They travel less than an inch in the air and can easily be stopped by a sheet of paper or the outer layer of a person's skin. Alpha particles are only harmful if their source is swallowed or inhaled. The waste disposed of at the Waste Isolation Pilot Plant (WIPP) is contaminated with radioactive material that primarily emits alpha particles.

Beta particles are more penetrating than alpha particles. They travel in the air for a few feet. Although they can pass through a sheet of paper, they can be stopped with a sheet of aluminum foil or glass. As with alpha particles, beta particles may cause the most serious effects in humans if their source is swallowed or inhaled.

Gamma rays, unlike alpha or beta particles, gamma rays are pure energy and are identical to high-energy x-rays. This type of radiation is penetrating and requires shielding with such materials as concrete, lead, steel or water to absorb its energy.

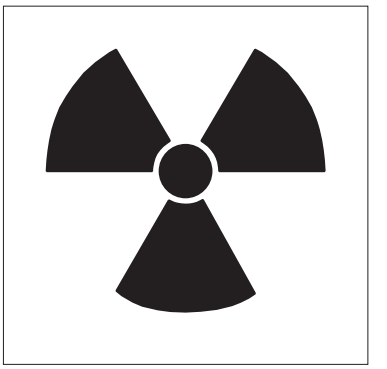
Exposure to radiation is measured in millirems. An average American's exposure is about 360 millirems per year. Roughly 300 millirems come from natural sources: 60 millirems come from man-made sources, primarily medical applications such as x-rays. Less than one millirem comes from nuclear power generation and nuclear weapons production.

Other Factors
Background radiation varies with location. Colorado's dose is higher than Louisiana's, due to both higher altitude and higher natural radiation in the soil. The thinner atmosphere at higher altitudes allows more radiation from space to penetrate. It is not uncommon for people to receive far more than the average of 360 millirems per year due to a variety of other factors. Airplane travel, dental and medical x-rays and occupation may affect average radiation levels.

Did you know ...

More than 80 percent of radiation we receive comes from natural sources, or background radiation.

Some Examples



- Flying in an airplane across the country would add about 5 millirems per flight to a person's annual dose because of the increased elevation during the trip.
- Airline pilots and flight attendants are exposed to higher levels of radiation routinely, an example of occupational exposure.
- Receiving a full set of dental x-rays would add about 40 millirems to an individual's annual background dose.
- Living directly outside a nuclear power facility would add less than 1 millirem per year.
- Working at a nuclear power plant adds about 300 millirems per year, another occupational exposure.
- Sitting on a park bench as a truck carrying nuclear waste passes by adds an insignificant exposure.

NOTE: This fact sheet provides a basic overview of radiation. The Waste Isolation Pilot Plant (WIPP) is designed for disposal of defense-generated transuranic waste only. Transuranic waste consists of clothing, tools, rags, residues, soil and debris contaminated with radioactive elements that are heavier than uranium. The word “transuranic” is derived from the Greek root trans, meaning beyond, and the element name, uranium. Therefore the word transuranic means “beyond uranium.” Uranium is the heaviest element to occur naturally in significant quantities.

Radiation from transuranic waste consists mostly of alpha particles that travel a short distance in air, but alpha particles are of concern primarily because they remain radioactive above background levels for thousands of years.

For more information

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