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FUSRAP Fact Sheet

Radiation at FUSRAP Sites

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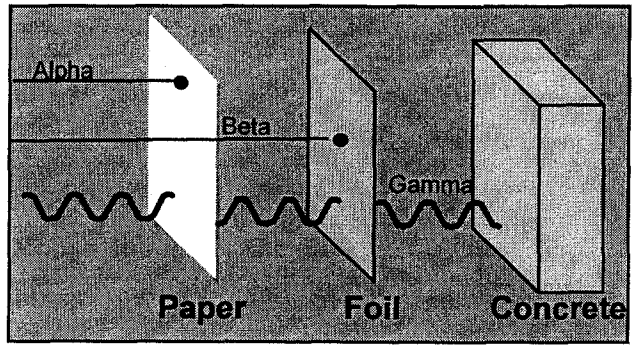
This is one in a series of fact sheets that provides information about regulatory, technical, and other issues considered in decision-making within the Formerly Utilized Sites Remedial Action Program (FUSRAP). This fact sheet discusses the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or Superfund. The Department of Defense's hazardous waste cleanup activity responsibilities are derived from CERCLA; the Resource Conservation and Recovery Act (RCRA); state and local requirements; standards, and guidance documents.

The Nature of Radiation

Radiation is a naturally occurring type of energy. It is released by unstable forms of atoms, the basic units of matter, as they change into more stable forms. The energy released is emitted as waves or particles.

• Alpha particles are the largest and slowest atomic particles. They can travel only a few inches through air. They can be stopped by a sheet of paper or the outer layers of skin.

• Beta particles are smaller and faster than alpha particles but can travel only about 10 feet through air. They can easily be stopped by a thin shield such as a sheet of aluminum foil.



• Gamma radiation consists of gamma rays rather than atomic particles. Gamma rays are a type of electromagnetic wave, much like X rays, and move at the speed of light. They travel farther through air than alpha or beta particles but can be stopped by a thick shield of lead, steel, or concrete.

Radiation cannot be seen, heard, smelled, or tasted. However, it can be detected and measured by instruments such as Geiger counters, dosimeters, and similar devices. Levels of radiation are expressed in several different units. One of the most useful is the rem, which measures radiation dose in terms of its potential health effects on persons who might be exposed to it.

Small amounts of radiation dose are expressed in millirems (thousandths of a rem), abbreviated as mrem. For example, a chest X ray produces a dose of about 40 mrem, a back X ray about 3,000 mrem, and a dental X ray about 150 mrem.

The amount of radiation that can leave the boundaries of FUSRAP sites is kept to levels as low as reasonably achievable. The exposure a member of the general public can receive as a result of radiation from FUSRAP sites is very low. The maximum allowable exposure is 100 mrem per year above background levels. By comparison, the average American receives about 360 mrem per year from background radiation and medical exposure.

Sources of Radiation

Sources of radiation include the soil and the food we eat. It also reaches us as cosmic radiation from outer space. For example, a resident of Denver, Colorado, receives about 50

mrem per year from cosmic radiation and another 63 mrem per year from the ground surface. Food accounts for about 20 mrem of our annual radiation exposure.

Natural and synthetic substances that emit radiation are called radioactive materials. Many buildings contain naturally occurring radioactive materials. For example, radioactive elements in the granite in the U.S. Capitol Building emit radiation producing an exposure of about 85 mrem per year. The human body itself contains substances that contribute about 11 percent of the average annual radiation exposure.

Some consumer products are also sources of radiation. A person who smokes two packs of cigarettes per day receives 8,000 mrem per year. Smoke detectors produce about 1/100 mrem per year. Certain household appliances such as color television sets and microwave ovens also produce very small amounts of radiation. On the average, consumer products account for about 3 percent of our annual exposure.

Radioactive Materials at FUSRAP Sites

During the early years of the nation's atomic energy program, many sites were used by the Manhattan Engineer District and the Atomic Energy Commission [forerunners of the Department of Energy (DOE)] for processing and storing radioactive materials. Congress later authorized DOE to clean up the radioactive material at these sites. In October 1997, Congress transferred FUSRAP to the U.S. Army Corps of Engineers.

Several sites with industrial contamination similar to that produced by MED or AEC activities have also been added to FUSRAP by Congress. The radioactive residues at FUSRAP sites consist mostly of forms of the elements uranium, thorium, and radium that emit low levels of radiation. FUSRAP was established to ensure that the public and the environment are not exposed to potentially harmful levels of radiation from these sites. The goal of FUSRAP is to clean up or contain the radioactive material so that the sites may be released for appropriate future use.

FUSRAP Radiation Protection

The first step in FUSRAP radiation protection is to determine the levels of radioactivity at the site and in surrounding areas. Air, water, soil, or other routes by which radioactive materials could spread are identified and monitored. At many sites, access restrictions minimize exposure of the public to radioactive materials. Proper storage methods keep contaminants from leaving the site through water or soil. Materials that emit gamma radiation are found in very small amounts at FUSRAP sites and decay more rapidly than materials emitting alpha and beta particles. The radiation produced by gamma-emitting materials decreases over time. FUSRAP provides protection by isolating and shielding them while they decay.

How do I get more information?

To learn more about radiation and other aspects of the Formerly Utilized Sites Remedial Action Program, please contact the U.S. Army Corps of Engineers FUSRAP Public Information Center at 1776 Niagara Street, Buffalo, NY 14207, **(716) 879-4438**. Or you may call the FUSRAP toll-free public access line at **1-800-833-6390**.

The USACE-Buffalo District home page address is ***http://www.lrb.usace.army.mil***