FACTSHEET: RADON

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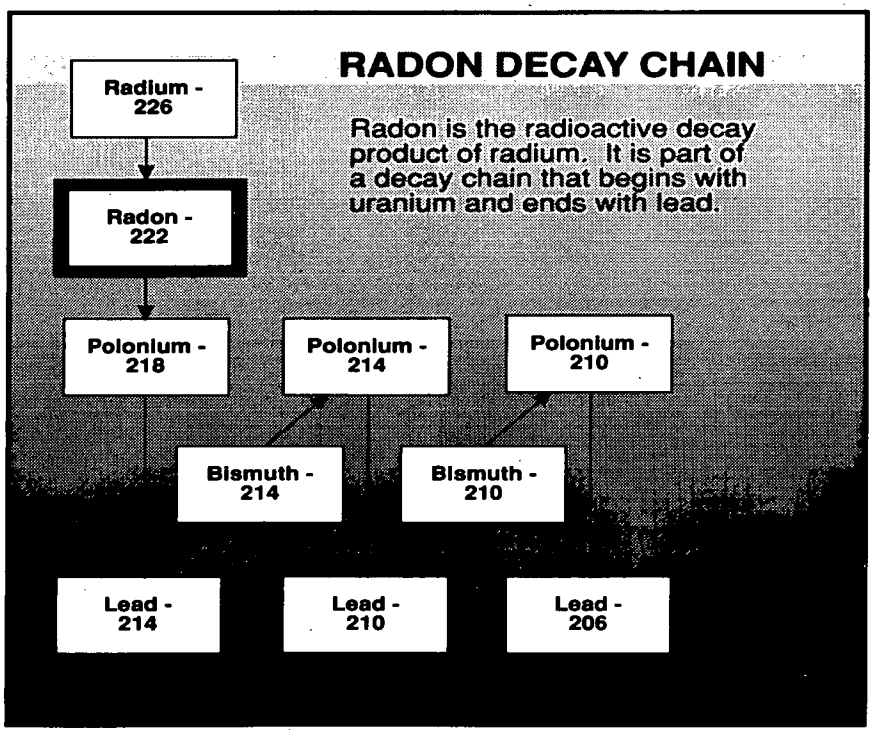
Radon

The scientific community has recently focused on radon, a naturally occurring gas that results from the radioactive decay of the element uranium. Uranium is present in small amounts in rocks, soil, water, and many common building materials. Everyone is exposed to radon because it is part of natural radioactivity that exists all around us.

The Feed Materials Production Center (FMPC) began uranium metal production in 1953 at Fernald, Ohio. Today, two tanks at FMPC contain residues that resulted principally from processing uranium pitchblende ore. These residues produce radon gases that exceed natural background levels at the tank storage site. FMPC also stores thorium, a thoron-emitting element. Thoron is chemically identical to radon. (For more information about thorium, please see the FMPC factsheet, *Thorium*.) However, the radon and thoron given off from storage facilities at FMPC rapidly disperse and decay to a natural background level.

An 18-month study by the Ohio Environmental Protection Agency has indicated that the radon present in homes surrounding the FMPC facility is not related to FMPC activities. In addition, independent studies by the Ohio Department of Health and the FMPC Environmental and Health Advisory Committee have confirmed that radon from the site is not a health hazard. Even though FMPC was not identified as the source of radon in area homes, FMPC recognizes the importance of minimizing the release of radon and thoron and of providing information on radon to the public.



What is Radon?

Radon is a radioactive gas that is invisible, orderless, and tasteless. Like many radioactive substances, radon transforms into another element by a process called radioactive decay. During radioactive decay, an invisible energy called radiation is released.

Radon is a gaseous radioactive decay product of radium. Radon is part of a decay chain that begins with uranium and ends in lead. Unlike many hazardous chemicals that can linger in the environment for years, radon diffuses into the atmosphere and disperses quickly. Radon has a half-life of only 3.8 days. This means that in 3.8 days, radon loses half of its radioactivity. In another 3.8 days, the remaining radon loses half of its radioactivity, and so on. In the radioactive decay process, radon transforms into a group of radionuclides called daughter products. Inhalation of these daughter products (polonium, bismuth, lead) contributes to our exposure from radon. Microscopic particles of these daughter products can attach themselves to lung tissue, emitting strong alpha radiation, and possibly causing lung cancers. (For more information about radiation, please see the FMPC factsheet, *Radiation*.)

Radon Levels

Different factors can cause a variation in the levels of radon to which we are exposed. The concentration of radium in the soil where a building is constructed is the major factor. High levels of radon can result from a greater radon flow rate in loose, unpacked soil; poor building ventilation; and the use of building materials that have a high radium content.

Recently, scientists have determined that the single largest source of natural radiation exposure is radon gas that can accumulate in homes and buildings. Outdoor concentrations of radon at the same locations are usually far less. Radon concentrations in building interiors is significant because Americans typically spend about 70 percent of their time indoors.

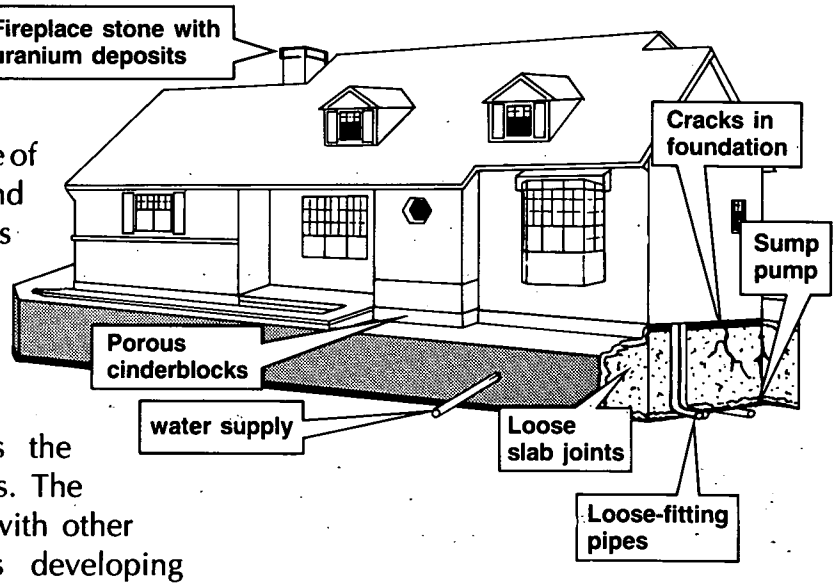
Measuring Radon

Radon concentration is measured by the amount of picocuries (a measure of radioactivity) of radon per liter of air (pCi/L). Outdoor concentrations average 0.2 to 0.4 pCi/L. Most homes have concentrations of radon ranging from about 1.0 to 2.0 pCi/L. In Ohio, from 30 to 35 percent of the homes have radon levels greater than 4 pCi/L, but two adjacent houses can have very different radon levels. Scientists have found higher than average levels of indoor radon in many parts of the country, including portions of Colorado, Maine, North Dakota, Pennsylvania, and Tennessee. Some buildings in Pennsylvania have radon levels as high as 100 pCi/L or more.

Radon Pathways Into Buildings

Radon can enter a building in various ways. The most important pathway is through building floors and foundations. A large percentage of buildings have concrete floors, which reduce the amount of radon that can enter a building. However, cracks, joints, and openings for pipes in the concrete floor tend to decrease this inhibiting effect. Wooden ground-level floors in buildings provide almost no reduction of radon. Scientists have recently discovered that the difference in pressure and temperature between the outside and inside of a building can pull radon out of the ground and through the floor in much the same way air is drawn up a chimney.

FMPC gives high priority to the public's awareness of environmental issues. Radon exists at FMPC, and a comprehensive radon monitoring program is in place to assess the effectiveness of FMPC's environmental controls. The U.S. Department of Energy, in cooperation with other State and Federal regulatory agencies, is developing comprehensive plans to improve environmental protection at FMPC. For more information concerning radon and other environmental issues, please visit the FMPC reading rooms at the plant site or at the Lane Public Library in Hamilton.



The pathways shown above are possible ways in which radon may enter the home. In homes where higher than normal levels of radon are present, steps can be taken to correct the situation and reduce the amount of radon entering the home.