

Appendix E: Radon

Radon is a radioactive gas produced by the decay of radium. It occurs naturally in almost all soil and rock. Radon migrates through the soil and groundwater and can enter buildings through cracks or other openings in their foundations. Radon's decay products can cause lung cancer, and radon is second only to smoking as a cause of lung cancer in America.

Based on early data, the EPA concentrated its radon reduction efforts on one- and two- family homes. Citing results from a radon survey conducted jointly with 25 States, the EPA and the Surgeon General's office issued a National Health Advisory that called for testing most homes for the presence of radon. Extensive research and case studies in the field have demonstrated practical remediation methods that typically reduce the indoor radon concentrations below 4 pCi/L, the current EPA action level for all occupied buildings.

Now that EPA technical guidance is being successfully used to reduce human health risk in homes, the EPA is emphasizing the development of radon measurement, mitigation, and prevention techniques for schools and large buildings. Preliminary data from a nationwide survey of Federal buildings indicates that radon will probably not be as widespread a problem in large buildings as it is in homes. One of the major factors for this difference is that multi-story buildings have proportionally less space in direct contact with the earth when compared to homes.

Some of the control technologies utilized for homes are being studied for their appropriateness to other building types, in-

cluding schools and large buildings. In addition, new methods and technologies are being developed to ensure a practical and cost-effective reduction of radon in these buildings. As a result, published documents on guidance and protocols for measurement and remediation of radon in large buildings are not currently available.

This publication provides an overview of radon issues, and should be used only as background information. For more information, refer to other sources of information that are specific to radon in indoor air.

BUILDING MEASUREMENT, DIAGNOSIS, AND REMEDIATION

Protocols specific to the measurement of radon and radon progeny in large buildings are tentatively scheduled to be published by EPA in early 1992. These large building measurement protocols can assist skilled building owner or facility personnel in making initial screening tests for the presence of radon. A new protocol specific to large buildings is necessary due to the major differences in building dynamics, HVAC systems, and occupancy patterns between large buildings and homes, and how these impact radon.

As part of its effort to develop widespread State and private sector capabilities, the EPA established a voluntary proficiency program (Radon Measurement Proficiency Program) for radon laboratories and commercial measurement firms. A *State Proficiency Report* (EPA 520/1-91-014), which gives information on specific radon measurement firms in your area, can be obtained from your State radon office or from your EPA Regional Office.

Three elements must be present for radon to be a problem: a radon source, a pathway that allows radon to enter the building, and a driving force that causes the radon to flow through the pathway and into the building. Preventing radon from entering the building is always desirable compared with mitigation after radon has entered. The reduction of pathways and driving forces are therefore usually the focus of attention during diagnostic and remediation efforts.

Due to the diversity and complexity of large buildings, and because the research and development of appropriate radon remediation technologies for these structures are in the early phases, generalized building diagnostic and remediation methodologies are not yet available. For assistance, please contact the appropriate organizations on the following list or a professional engineering firm or mitigation company with experience in this matter.

WHERE TO GO FOR ADDITIONAL INFORMATION

State Radon Offices

There are several ways to get the name of a contact person in your State radon office or information about that office. You can call the radon contact in the EPA Regional Office for your state or you can order the *Directory of State Indoor Air Contacts* from the EPA Public Information Center. (See list of IAQ and radon contacts and list of EPA publications in *Appendix G*.)

Regional Radon Training Centers

As part of its effort to develop State and private sector capabilities for radon reduction, the EPA has coordinated the formation of four Regional Radon Training Centers (RRTCs). The RRTCs provide a range of radon training and proficiency examination courses to the public for a fee.

Eastern Regional Radon Training Center

Rutgers, The State University
Livingston Campus, Building 4087
New Brunswick, NJ 08903-0231
908-932-2582

Mid-West Universities

Radon Consortium

University of Minnesota
1985 Buford Avenue (240)
St. Paul, MN 55108-6136
612-624-8747

Western Regional Radon Training Center

Guggenheim Hall
Colorado State University
Fort Collins, CO 80523
1-800-462-7459/303-491-7742

Southern Regional Radon Training Center

Auburn University
Housing Research Center
Harbert Engineering Center
Auburn University, AL 36849-5337
205-844-6261

EPA Regional Offices

If you want additional information from EPA regarding radon, start with the EPA Regional Offices. Telephone numbers for radon information contacts are given in the list of EPA Regional Offices in *Appendix G* of this publication.

EPA Radon Division

If information is unavailable from the above sources, please contact the EPA Radon Division at:

Radon Division (ANR-464)
U.S. EPA
401 M Street, SW
Washington, DC 20460
202-260-9605