#4012

Facts about radon and radon testing

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THE U.S. EPA and Surgeon General's Office have issued national advisories urging that all homes and schools be tested for radon. The widespread nature of the problem has increased the number of companies entering the radon testing and correction business during the past year.

Because many homeowners don't know where to turn for reliable testing and assistance, the market is ripe for scam artists, many of whom have been uncovered in media probes.

Homeowners should select a radon testing company or service company the same way they would any other contractor coming into their home. Radon is easily corrected and becomes a serious problem only if homeowners choose to ignore it.

Radon contractor qualifications

Some state health, environmental or radiation departments provide lists of contractors who have been certified or recognized by the state as having the qualifications necessary to carry out radon corrective work. Generally, a reputable radon contractor's qualifications should include the following:

— A contracting background in areas such as heating and cooling, construction or renovation.

— Participation in a three- to five-day EPA course on radon reduction methods.

— Proof of certification if a certification program exists in the contractor's state.

— Proof of having passed the EPA's National Radon Contractor Proficiency Test Exam.

— References from other homeowners who employed the contractor.

Selecting a contractor

When selecting a contractor, homeowners should be wary of hiring one who does not conduct a thorough assessment of the house before proposing a solution, or who says that one mitigation method corrects all problems. Homeowners should carefully evaluate all proposals for corrective work; the lowest cost proposal may not be the best.

Look for contractors who are prepared to back up their work with an annual service check (typical cost is $50-$90). Also consider installing an electronic radon monitor to ensure the system continues to keep radon at a safe level.

Health risks

Some background information on radon may be helpful. First, radon is a colorless, odorless gas produced by the natural decay of radium and uranium in rocks, soil and water.

Radon is one of the best-documented indoor air contaminants. It was first identified in underground mines in the 1930s, and subsequent studies on miners have clearly proven the link between long-term radon exposure and lung cancer.

The National Cancer Institute estimates that 20,000 of the annual 130,000 U.S. lung cancer deaths can be directly attributed to radon exposure. The risk is even higher for

Radon Measurement Devices

Method	Measurement Period	How Analyzed
Carbon canister electret	2 to 7 days	Laboratory
Long-term alpha track electret	1 month to 1 year	Laboratory analysis after exposure of 1 month to 1 year
Direct reading, (continuous radon monitors) grab sampling; working level monitors		Direct reading on site. Multiple and on-going readings are provided. Some are tamper-resistant. Intended for professional users.

SPECIAL SESSION
on

THE USE AND CONSERVATION OF CFC REFRIGERANTS

Tuesday, February 13, 1990 1:00 pm - 5:00 pm
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KEY TOPICS:

- **Differences among halogenated refrigerants (CFCs and HCFCs)**
- **Legislative and regulatory programs to restrict the production and use of CFCs and HCFCs**
- **Impact of reduced CFC refrigerant supply upon existing equipment and systems**
- **Conservation of existing CFC refrigerants**
- **Reduction of CFC use by good operating, maintenance, and service practices**
- **Application of new HCFC and HFC refrigerants in existing new equipment**
- **Use of alternative refrigerants including:**
  Modification and replacement of existing systems
  Innovative applications

WHO SHOULD ATTEND

Installation and service technicians **Contractors** **Building Maintenance Engineers**

LECTURER

Herbert T. Gilkey, has been involved with the CFC/ozone depletion issue for the past 15 years. He has been active in recent air-conditioning and refrigeration industry responses to CFC initiatives both as Director of Government Liaison for the Sheet Metal and Air Conditioning Contractors National Association and in his present role as an independent engineering consultant.

Mr. Gilkey is a Fellow and Life Member of ASHRAE and has received the Society's Distinguished Service Award. He is currently chairman of the committee that has developed ASHRAE Guideline 3P **"Guideline for Reducing Emission of Fully Halogenated Chlorofluorocarbon (CFC) Refrigerants in Refrigeration and Air-Conditioning Equipment and Applications."**

LOCATION
World Congress Center Room #263
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smokers who are exposed to radon gas. Some research suggests that children and the elderly are also at a higher risk level.

The health risk is related to two factors: the concentration of radon gas and its decay products; and the length of time an individual is exposed. Since the average person spends 90 percent of his time indoors, determining the indoor radon concentration is a critical first step.

Direct measurement is the only way to determine whether high levels of radon exist in a home or school. Radon gas is measured in a unit called a pico-Curie per liter (pCi/l). The EPA currently recommends taking immediate corrective action if the annual average level of a home or school exceeds 4 pCi/l.

Many experts believe the 4 pCi/l level is still too high because it poses the equivalent risk of being exposed to 200 chest X-rays per year.

Radon testing process

The EPA recommends a two-step testing process. First, take a short-term (48 hr) screening test. Second, if warranted, conduct longer-term follow-up testing (one-month to a year). The EPA also estimates that 20 to 30 percent of all homes in the United States have radon levels exceeding the current EPA action guideline.

Short-term screening for radon usually involves placing one or two measurement devices inside a structure for one to seven days. The EPA recommends testing on the lowest livable space of the house under conditions where the house is closed up for the duration of the test, much like it would be in the winter heating and/or summer cooling season. This will clearly reveal worst-case conditions.

Radon can enter a building in several ways. It can seep through cracks in concrete floors and walls, floor drains, sumps and through pores in hollow masonry block walls. The negative pressure created by exhaust fans, furnaces or fireplaces can draw the gas into the building through these common openings. Well water, when used for washing and showering, may also be a source.

Geography has nothing to do with the presence of radon. It was originally believed that certain geographic areas of the country were more prone to high radon levels. However, further testing and research have revealed that the occurrence of high levels is random.

For example, one home in a neighborhood may test with very low levels, while the house next door tests high. That is why the EPA and Surgeon General's Office recommend that every home and every school be tested.

Radon levels vary greatly over the course of a day, week, season or year. Inside/outside temperatures, outside climatic conditions, moisture levels of the soil, how a building is constructed and how the mechanical systems work are just some of the factors affecting radon levels.

Because radon levels vary greatly, corrective action should never be based on results of only one or two screenings. Short-term measurements can vary by 600 percent or more from a longer measurement period, but are the best way to determine the potential for a problem.

Follow-up testing

Depending on the results of the screening test, a long-term follow-up measurement is usually the next step in determining the annual average exposure.

The time period for follow-up testing is usually one month to a full year. Several short-term measurements during the four seasons are also an acceptable option. A trained, professional contractor can be an invaluable resource in ensuring proper placement of devices and guidance in interpretation of results.

There are several devices used to measure radon as shown in the accompanying chart. They include: carbon canister electret; long-term alpha track electret; and direct reading, grab sampling working level monitors.

There are several steps homeowners should take when testing indicates elevated radon levels. First, arrange for additional testing in different places of the home to verify the extent of the problem. Testing at different times of the year also may provide additional information. If a testing service is being used, it should be able to provide additional guidance with measurement results.

If a high level is confirmed, a number of temporary actions can be taken until a permanent solution can be provided by a trained contractor. These actions include:

— Avoid spending time in rooms where high levels have been identified.

— Stop smoking because the combination of radon and exposure to tobacco smoke can considerably increase risk.

— Ventilate high-level rooms and encourage air circulation by opening windows and using fans.

— Seal cracks and openings at below-grade levels. This can be can be attempted by a homeowner, but it rarely provides adequate reductions of radon levels.

Radon can be controlled using two basic methods, source control and dilution. Source control stops radon gas before it enters homes by using caulking, sealants and sub-slab suction to draw air beneath basement walls and floors outside before it gets into the house. Dilution uses natural and forced ventilation. For example, open a window or use mechanical ventilation such as air-to-air heat exchangers.

While radon correction solutions tend to be simple, the best solution may vary from house to house. It is important to have a trained contractor evaluate the home for the best possible method. ■