Radon

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Last update: Monday, 08 Dec 2014 at 5.44 pm.

Radon

What is Radon:

•Radon is a cancer-causing radioactive gas. Which can't be seen or able to taste and smell. It has been reported radon is the **second** leading cause of **lung cancer** in the **United States** today. **Figure 1:** on the right below showing the distribution of Radon in the USA (North America).

•Smoking and high radon levels increase the risk for developing **lung cancer**.

•Studies of radon exposure indicate that children may be more sensitive to radon exposure, due to their higher respiration rate and their rapidly dividing cells, hence may be more vulnerable to radiation damage from radon.

Properties of Radon:

• Radon is a gaseous **highly radioactive** element discovered by English physicist Ernest Rutherford in 1899.

• Radon is a **colorless**, **chemically unreactive inert** gas.

• The **heaviest** known gas, radon is nine times denser than air, sue to it being a single gas not diatomic like oxygen.

• has a very good **penetrating ability**, is able to penetrate through paper, leather, low density plastic (eg.plastic bags) most paints, and building materials like sheetrock, concrete block, sheathing paper, wood paneling, and most insulations.

• Radon is quite **soluble** in water and organic solvents.

• Radon is considered to be an inert gas thus reactions with other compounds are rare, however it is able to form stable molecules with highly electronegative materials.

• Radon is a **noble gas**, which has several isotopic forms. Only two are found in significant concentrations in the environment: **radon-222, and radon-220**. Radon-222 is involved in radioactive decay of uranium-238. Radon-220 is formed in the decay of thorium-232.

• Atmospheric releases of **radon-222** results in the formation of decay products that are radioisotopes of heavy metals (polonium, lead) which rapidly attach to other airborne materials such as dust and other materials which facilitate inhalation.

Production:

 National Radon Defense (http://www.radonmitigationspecialists.com/)

• Radon is not commercially produced, but is a *naturally* occurring radioactive gas from the natural breakdown (radioactive decay) of uranium.

• It is found in **igneous rock** and **soil** usually, but in some cases well water may also be a source of radon.

Exposure:

• The primary routes of potential human exposure to radon are **inhalation and ingestion**.

• Radon in the ground, groundwater, or building materials enters working and living spaces and disintegrates into its decay products. high concentrations of radon in groundwater may contribute to radon exposure via ingestion, the inhalation of radon that is released from water is usually more significant.

Radon exposure in workplaces:

• Large concentrations of radon are found in confined air spaces, this is commonly found in underground work areas such as mines and buildings.

• Exhalation of radon from ordinary rock and soils and radon-rich water can cause an increase in radon concentration in tunnels, power stations, caves, public baths, and spas.

• Radon exposure is found in many occupations, underground uranium mineworkers are exposed to the highest levels of radon and its decay products.

• Some houses have radon levels higher than the control levels in underground mines. A survey of 11,600 homes in ten states in the USA indicated **21 percent of homes** might exceed the maximum radon level indicated by the **U.S. Environmental Protection Agency (EPA)**. The majority of these homes are in areas known to have high background levels of natural radiation, but not all of the homes in such regions are affected, and not all of the affected homes are located in the regions stated.

Symptoms of high exposure:

• There are no symptoms of radon intoxication, as it is a colourless odourless gas, effects usually occur after years of exposure.

Prevention:

•Radon levels can be tested, regularly in the home in order to know how much exposure there is in different homes. This is a large environmental problem affecting **8 million homes** in the USA. The **US EPA**, **American lung association** and **medical association** have suggested this method.

• Stop smoking in homes as smoking and increased radon levels increase the risk of **lung cancer**. This is the most cost effective method.

• Radon measuring devices: The detector is placed in the least livable place of the house and left there for the prescribed length of time, and then sent to the manufacturer, who sends you a report.

• Radon levels vary from place to place in the house and from time to time during the year. It is recommended to have at least two detectors, place them in the living room and bedroom, and take two readings, one in midsummer and one in midwinter. The average of the total readings is then a good estimate of year-round exposure.

• The radon testing kit services found to be most reliable are **Air Chek, Inc. (1-800-247-2435)** and **American Radon Services, Ltd. (1-800-272-3668)**.

• Improving the ventilation systems in existing homes especially in parts of the country and places where there is an increase in risk.

• Educating the population to avoid the use of the basement as major living area, and substances that have radon.

References/Links:

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