RADON

The planet has naturally occurring uranium throughout it. Radon is unique from other uranium products as it is a gas. As a gas, it can migrate from the source of the uranium into surrounding soils. Radon has always been around and humans have been breathing it forever. The question is not if radon is dangerous, but rather at what levels is it dangerous.

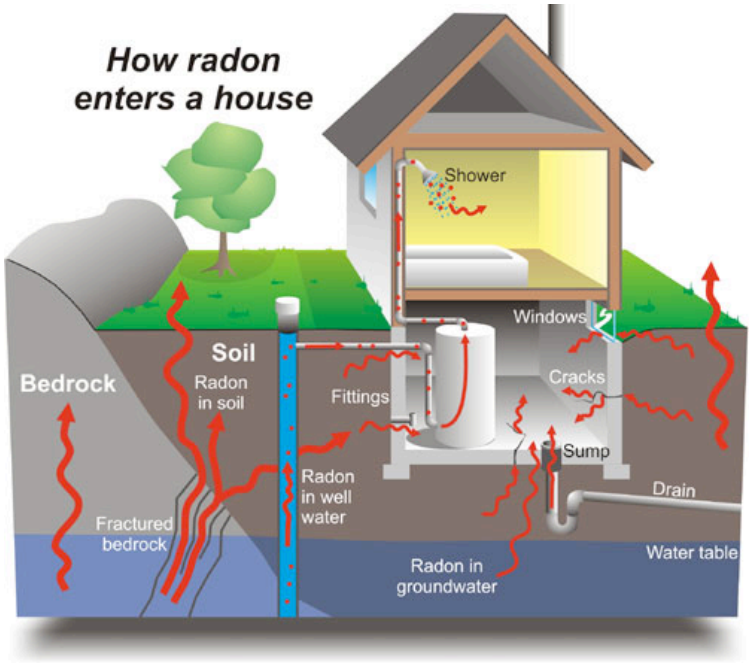
When uranium decays, one of the elements it produces is radon, which is Radon 222. The Radon 222 decays into more sub-particles, creating polonium 218, which then decays into lead 214, which then decays into bismuth 214, then again decays into polonium 214. Each decay process takes a different time, which is measured by half-life's. The half-life of radon 222 is 3.8 days. This means that if you had a full jar of radon, in 3.8 days it would decay into one half of a jar and after 7.6 days it would have decayed into one quarter of a jar. The half-life of the polonium 218, lead 214 and bismuth 214 is about 30 minutes while the half-life of the polonium 214 is .00016 seconds.

When the radon gas is airborne, breathing it means that one of these isotopes can become "lodged" in the lungs. While the EPA has set limits for what is considered to be high radon levels, the complexity and unknown factors make these numbers somewhat arbitrary.

Radon is quickly diluted by the atmosphere when it reaches the earth's surface. When a home is built on the soil, the dilution of the radon is slowed and radon levels in the home can increase. Soil conditions and the location of uranium isotopes under the structure will influence how much radon can enter the building. Of equal influence is how radon can be drawn into the building. As radon is a gas, it moves with airflow. In buildings there is a pressure differential between the exterior and interior of the building. As air

leaks into the structure from below, a stack effect is created as the exhaust leaks out, creating a negative pressure in the building; this draws radon gas up from the ground and into the building. Typically, the greater the pressure differential, the higher the radon level, as more radon gas is sucked into the structure.

Preventing radon in new construction is dictated by building code. Often, perforated pipes are installed on the ground, and then covered with gravels and then a vapor retarder product such as plastic or spray foam is installed over the gravel. The perforated pipes are vented to the outdoors. This allows the radon gas to escape from beneath the building instead of being drawn into it. Sometimes a blower is used to create a positive pressure in the crawlspace to keep the gas from entering. Mechanical ventilation of a crawlspace is another way to remove radon gas before it can enter the living space. In cold weather climates, the positive pressure system and mechanical ventilation systems should be reviewed for the introduction of cold air into the structure. Heat recovery systems can also be used to help exhaust radon gas that has entered the home.



As radon is a gas, the most cost effective method to limit its entry into a building is to install a vapor/gas barrier. A list of EPA approved products can be found in the EPA "Radon Reduction Techniques for Detached Houses, second addition" The products listed vary from plastic sheathing to spray foam, caulking and cement sealer. As radon is a gas, many products are available to stop its movement. It is important to insure that holes in the vapor/gas retarder are sealed. As local building codes vary, compliance needs to be verified with the building inspector.