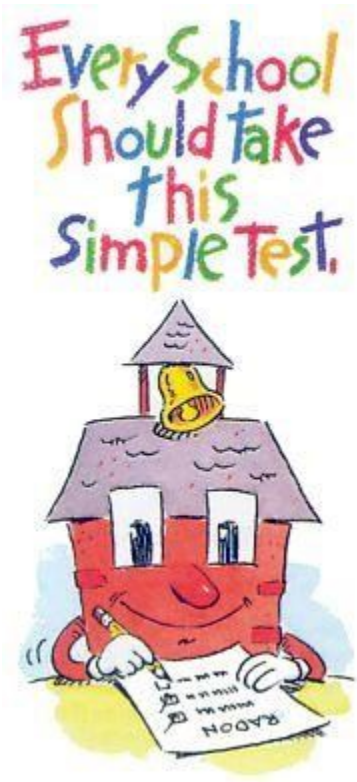
What's New with Radon Gas?



Radon gas is a colorless, odorless gas that is a result of naturally occurring uranium breaking down in the ground. Radon levels can fluctuate widely based on the time of day, season, weather conditions, building pressurization, etc. Current EPA studies have shown that exposure to levels above 4 picocuries / liter can lead to a significantly increased risk for lung cancer. After smoking, radon gas is the second leading cause of lung cancer in the United States causing an estimated twenty-one thousand (21,000) lung cancer deaths a year. That's 7 times more deaths than from drowning and more than 3000 more deaths per year than caused by drunk driving.

The U.S. EPA estimates that more than 70,000 schoolrooms in use today have high short-term radon levels. The current EPA action level for radon gas is 4 picocuries / liter. Since there is no safe level of exposure, there have been some recent studies recommending significantly lowering the action level.

Testing for Radon

The only way to know if your building has high levels is to test for radon gas. Based on the type of facility and occupancy patterns, the EPA recommends testing with short-term detectors for 48 -96 continuous hours or long-term detectors for 90 plus days. Larger commercial and school buildings can have multiple points of entry, different building HVAC systems, different building pressurization and a whole host of other factors that result in varying levels of radon throughout the building.

For School buildings, the EPA recommends that detectors should be placed in all frequently occupied rooms that come in contact with the ground. Testing is recommended to be done with closed building conditions to establish worst case scenarios. This is typically the winter months in Wisconsin.

What do levels above 4 pCi / L mean?

When evaluating radon test results in our building, it is best to look for patterns in the results. Depending on the type of test taken, when it was taken and building conditions, some variation will exist. In addition, we must seriously consider the actual radon gas levels when the building is occupied. This is particularly true in schools, office buildings and commercial facilities with large air handling systems that have effective air exchanges as test results may overstate actual exposures when the building is occupied.

Here's why…Properly designed and maintained large HVAC systems generally put buildings under positive pressure. Building codes also call for increased number of air exchanges and fresh air intake when the building is occupied. These factors greatly reduce the levels of radon in the facility when the HVAC systems are running. Hence, actual radon levels during occupied times in these types of facilities are likely significantly lower than current testing results indicate. Some recent studies have shown radon levels to be 5-10 times lower in occupied times then peak levels. This theory assumes that HVAC systems are properly balanced and maintained. It is quite possible that a system that is not functioning properly could create negative pressure situations in some rooms (increasing radon gas entry) and thereby higher levels in select areas.

Things to consider:

- In larger buildings, very few systems are evenly balanced. That is why it is imperative to simultaneously test all frequently occupied rooms that are in contact with or directly above soil. Review your results to determine if all areas were adequately sampled and look for patterns in the results.

- Long term testing in frequently occupied rooms over the winter months is the preferred sampling strategy for this climate. Results for tests collected over other time periods are likely understated and short-term test results are statistically much less reliable than longer term samples.

- If HVAC systems have changed or building renovations/additions have occurred, building pressurization has changed meaning the interior radon levels have changed as well. Retesting may be warranted if building conditions have changed.

- If HVAC systems were running during your testing period, it is possible your results are overstated for occupied times. Your results are average levels that include nights and weekends when systems were run less frequently. Hourly measurements with a continuous monitor in at least one location would help show these fluctuations and likely show lower levels when students and staff are actually in the building.

- Residential systems are usually quite different than commercial systems and times of occupancy are different as well. Averaged results are more indicative of true exposure in these types of facilities.

- If mitigation systems are in place, limited periodic testing should be done to ensure systems are operating properly and site conditions have not changed levels of radon entering the building.

- Prior to construction, consider Radon-Resistant Construction techniques including a gas permeable layer of gravel beneath the slab, plastic sheeting placed on top of the gas permeable layer, sealing all openings in the concrete foundation and gas-tight vent piping installed during the construction process.

As with most environmental issues, a periodic review of your programs is prudent and radon gas is no exception.

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