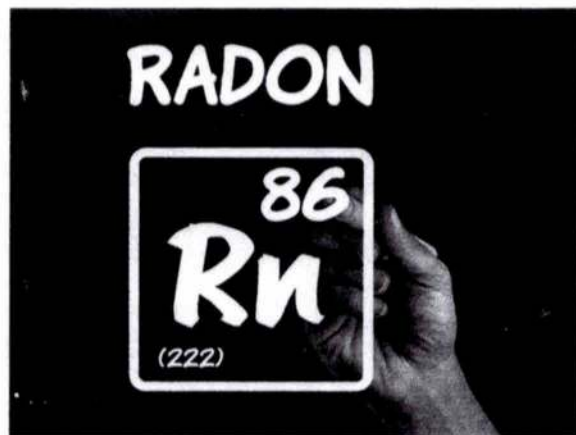


Limitations of Two-Day Radon Screenings

BY KURT SALOMON



IN TWO PREVIOUS REPORTER ARTICLES (Radon is Real and It Causes Cancer — Parts 1 and 2), we discussed what radon is, the dangers associated with it, and the protocols for proper testing and mitigation of it. This month, we will discuss some of the limitations that are inherent in the type of testing that we perform as part of a real estate transaction.

A Moving Target

In most homes, the radon level is a moving target. It varies from hour to hour, from day to day and from one season to the next. Wind, rain, snow, varying temperatures and barometric pressure can all cause dramatic changes in indoor radon levels.

Sample Size

Back in the days before 1989, the first radon tests for real estate transactions consisted of samples taken during a 24-hour period. Nowadays, we take a 48-hour sample. While this modern standard gives us much more data, it still can only tell us what is happening during those two days. It cannot tell us what radon levels are like for the other 363 days of the year. Even when we follow the EPA protocols in an effort to create worst-case conditions, these samples can provide misleading information.

Year-long tests that use alpha track devices provide an average of radon levels for an entire year, but only that — an average. They don't show the peaks and valleys that can be so important. If you have one foot in ice water and one foot in boiling

water, you might feel average. Likewise, a year-long alpha track test might experience wide swings in radon levels, but only show a moderate average. The health risks from radon are associated with a time-based exposure: how long you're exposed and at what level. The peaks are more important to us than the valleys or the average.

Seasonal Fluctuations

Based on 1,800,000 tests done by a national test organization, AirChek, there is a seasonal variation of radon levels depending on the month the test is done. The seasonal variation is repeatable. This is a table of variation of radon levels.

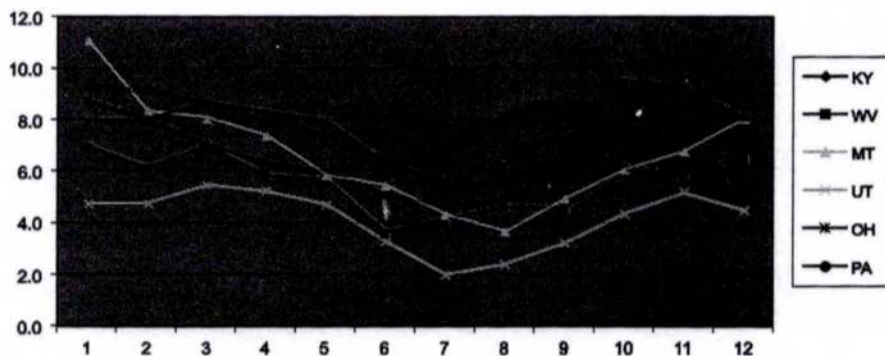
	MT	PA	OH	KY	WV	UT
Winter	11.1	9.4	8.0	8.8	7.0	4.7
Summer	3.7	5.5	6.3	5.0	4.6	2.4

The flowchart shows more distribution levels.

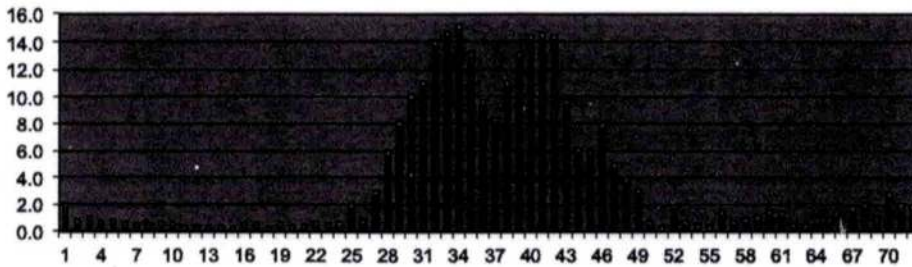
There are several reasons that account for the seasonal variation. One reason is thermal stacking. The stack effect is the movement of air in a building resulting from air buoyancy. The buoyancy result is either a positive or negative. The greater the thermal difference and the height of the building, the greater the buoyancy and thus the stack effect.

During the heating season, the indoor air rises up through the house and escapes through open windows and ventilation openings. This rising warm air reduces the pressure at the base and cold air causes the radon to get trapped in the house.

A second reason is frost on the ground. Gases travel the path of least resistance such as a dry basement and dry crawl space. Then the thermal stacking has an effect.



3 Days 3.9, 2 Days 5.3



Weather Effect

The following is an example of a third-day test. If a radon tester checked a house for radon and found the level at 3.9, according to the EPA there is no problem. However if the tester tested the same house at 5.3, there is a problem. Does the tester know what he is doing? Are the test results reliable? Was there a storm coming through the tested area? The EPA states the guideline for high winds are at 30 mph over the average wind. How often are winds over 30 mph? Weather can and does affect radon levels.

Abnormal Effect

A most unusual radon test from a home in Saratoga Springs, Utah, produced a graph with a bell-shaped curve. At the height of the curve, radon levels exceeded 60, while at the lower end they were below 2. Even odder, the bell-shaped curve reappeared during the clearance test, after the mitigation system was installed. After discounting correlations with the weather and the possibility of tampering, we suspect that

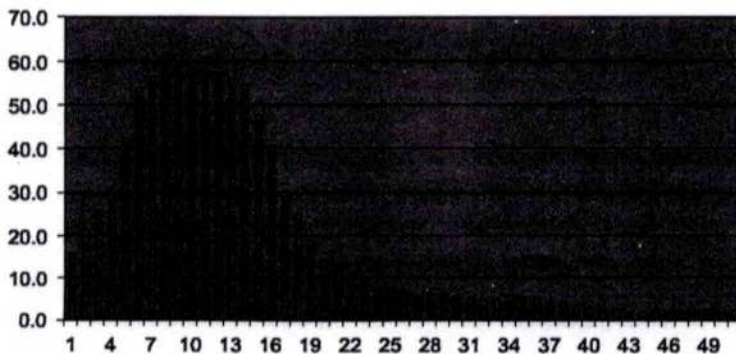
the wide swings in radon levels were the result of water movement underground.

Summary

There is a seasonal variation to radon levels. Storms during a radon testing period can also elevate the radon levels. The real estate industry has imposed an unrealistic time frame of two days. The real exposure to radon is how long you are exposed to radon and at what level. At best, a two day test shows the potential for elevated levels of radon. The true test of radon is a year-long period. This is unrealistic in a real estate transaction. ■



Kurt Saloman was 2011 ASHI President, founded the Utah ASHI Chapter, has been a home inspector since 1992 and has a BS in Mechanical Engineering from the University of Illinois. He serves on two American Association of Radon Scientists and Technologists (AARST) Standard Committees, Radon Resistance New Construction and Radon Testing.



Nancy Bredhoff — Young Pioneer in Radon Testing

Appreciates Ongoing Challenges, Rewarding Experiences

In 1985, Nancy Bredhoff wrote the initial business plan for Radon Testing Corporation of America (RTCA), which became operational in 1986. It wasn't until the mid-80s that the public understood the health issues and challenges of indoor radon. In 1986, the home inspection industry was an emerging market and radon testing as part of the real estate transaction was also an emerging market. The RTCA business plan addressed the importance of marketing to home inspectors to become radon professionals.

Today, almost 30 years later, Nancy Bredhoff is President of RTCA, after first serving as Managing Director. When she developed the plan, however, she had just received her MBA degree from Columbia University's Graduate School of Business. Young as she was, her professional commitment to indoor radon testing was initially inspired by Stanley Watras and Andreas George.

"I heard the story of Stanley Watras, whose experience prompted government interest in indoor radon. One day in 1984, when he went to work at the Limerick Power Plant in Pennsylvania, he triggered the radiation alarms. But it turns out the plant was not the problem. Watras had unknowingly brought the radiation with him from his home, where the radiation levels were 700 times above the safe level," Nancy explains. He and his family were immediately evacuated.

Nancy also met Andreas George, physical scientist and health physicist with almost 40 years of experience in the radon field. His credentials and professional contributions are so impressive that RTCA refers to him as the "Radon Guru."

As she began her career at RTCA, "it was a big education process, always learning more myself and educating mortgage brokers, realtors and home inspectors about indoor radon health issues and testing challenges.

"When I attended ASHI's annual conference in 1988 in San Francisco, RTCA was the only radon exhibitor, and I was the only female and probably the youngest. And it was a challenge
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...Continued from previous page because not many of the home inspectors understood the need for radon testing in the real estate transaction."

In September of 1988, the Surgeon General had a joint press conference with the EPA and recommended that all homes be tested for radon. As a result, consumer demand for radon test kits surged overnight.

Also in 1988, Ralph Nader's Consumer Advocacy Group, Public Citizen, conducted a blind testing of different radon labs. The result was that, in 1989, RTCA was rated #1 Radon Laboratory in the United States and was featured in the media and recognized by professional associations and government agencies. However, the survey also revealed the poor quality of other radon test kits, which had a negative effect on the retail market. "We survived because we had a quality service and had developed a computerized lab information management system for all aspects of the lab analysis, which included bar-coding all test devices. We were the first to link different dimensions of the process, which resulted in quality control and reliable results." RTCA's quality service has been its benchmark and it continues to get top ratings by the leading consumer agency.

Nancy was one of the founding members of the American Association of Radon Scientists and Technologists (AARST) and served on its Board of Directors for 12 years. She currently serves on the Board of the National Radon Safety Board (NRSB) and was President of the NRSB from 1998 to 2012. The NRSB became responsible for certification of radon professionals when the U.S. EPA closed its program and privatized the radon proficiency program in 1998.

"I am proud to be a woman in the radon testing field, and I'm encouraged that more women are becoming home inspectors. My credibility rests on RTCA's quality of service. During the 1980s and 1990s when developing our products, I was very fortunate to work with great scientists. While most were men, gender was not the issue. It has always been about securing great talent." ■

Radon Mitigation Systems in Existing Homes

Ready for Inspections

BY SALLY CHAPRALIS

Many ASHI members have added radon testing to their home inspection services since the early 1990s. ASHI is now considering a certificate for completion of an educational program focusing on inspection of radon mitigation systems in existing homes.

"Radon systems have been installed since the 1980s, but many systems, which were 'permanent' installations, may no longer be performing as expected," explains Shawn Price, President of The American Association of Radon Scientists and Technologists (AARST). "Properly installed systems may have been altered, damaged or simply showing their age, while others may have been put together in a rush, leading to sloppy workmanship, and violations in the mitigation standards such as substandard materials, wiring without licensed electricians, improper discharge points. These problems often affect the long-term operation of the system and, quite frankly, are dangers to the families living in these homes. It is in our best interest to properly train professionals to identify the problems and potential hazards. It makes sense that home inspectors could fill this need of system inspection."

Shawn notes that builders who are installing radon mitigation systems at the time of construction often do not understand the qualities of a fully functional system that makes them work, much less meet the standards. "Instead, when making a decision about a system installer, they often turn to the plumbers since they are the subcontractor who glues PVC pipe, going with convenience and price and not on knowledge and experience. Furthermore, if the system is, for example, ten or more years old, it's already getting old and may not be functioning properly. So, while many systems have been installed, no one is looking at them. This could be a new and important role for home inspectors."

As ASHI explores this critical issue and opportunity for its members, it will consult with AARST about the content for an ASHI Continuing Educational program and certificate of completion.

AARST is an accredited standards developer (by the American National Standards Institute ANSI) and is the caretaker of national radon standards in the United States. AARST also administers the National Radon Proficiency Program (NRPP) that certifies radon testing and mitigation professionals, and many of them are also members of ASHI.

"While radon mitigation system testing may be considered an 'ancillary' service and is not yet covered in home inspection schools and Standards of Practice, it becomes more critical every day," Shawn adds. "The complexities of standards are always evolving and, thus, so is the need for training to remain current and relevant."

"While existing systems must be inspected and we have to retrofit systems that may have worn out, builders are being pressured to install systems in new buildings."

"It's obvious that radon inspection is required for public health concerns, and, as our nonprofit association's members understand, AARST is dedicated to high standards and ethical performance. We look forward to working with ASHI as it addresses its educational and professional goals." ■

Sally Chapralis is the Consulting Editor for the ASHI Reporter. Her writing, business communications and PR experience includes working with construction and real estate industry publications.