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Radon in Your Home: An Overview for New Hampshire Homeowners

RADON OCCURRENCE IN A HOME

Radon is a naturally occurring radioactive gas that is commonly found in bedrock and in water from bedrock (drilled) wells in New Hampshire. Radon gas is colorless, odorless, and tasteless.

Radon gas finds its way into indoor air mainly by migrating from bedrock, through the soil, and into the home via cracks or other openings in the foundation. Radon from bedrock wells is released into indoor air during showering, dishwashing and doing laundry. Dug wells and point wells tend to have minimal to no radon. The amount of radon released from stone building materials such as a granite block foundations, fireplace materials, counter tops and floor or wall tiles is usually insignificant.

HEALTH RISK and MEASUREMENT

Exposure to radon poses an increased risk of developing certain types of cancer, primarily lung cancer and stomach cancer. Radon concentrations in both air and water are measured in picocuries per liter (pCi/L). A general rule of thumb is that for every 10,000 pCi/L of radon in a home's water supply, the radon concentration in indoor air is increased by 1 pCi/L.

RADON RISK FROM AIR

The increased risk of lung cancer is due to inhalation of radon-laden indoor air, including any radon entering the building through the water supply. (There is also an increased risk of stomach cancer due to ingesting radon in drinking water.) Any amount of radon in air or water increases one's risk of lung cancer; the greater the amount, the larger the risk. Radon is the leading environmental cause of cancer deaths in the U.S. and the leading cause of lung cancer in non-smokers. Exposure to a combination of radon gas and cigarette smoke creates a greater risk for lung cancer than either factor alone. Long-term exposure to radon leads to the deaths of an estimated 100 New Hampshire residents each year.

RADON RISK FROM YOUR HOME'S WATER SUPPLY

The U.S. Environmental Protection Agency (USEPA) has indicated that the inhalation of radon in air poses a much greater risk than radon in your water. It is always recommended that homeowners test their airborne radon in the home, as this presents the greater risk (see REDUCING HEALTH RISK below).

There are no federal or state standards for radon in drinking water. However, there are public health advisories for radon in drinking water, including that issued by USEPA. The New Hampshire Department of Environmental Services (NHDES) recommends the following:

- For private wells with radon concentrations at or above 10,000 pCi/L the treatment of water is

recommended in conjunction with mitigation of indoor air radon. Homeowners should consult with radon mitigation and water treatment providers.

- For private wells with radon concentrations between 2,000 and 10,000 pCi/L, the treatment of water may be advisable if air concentrations in the home exceed 4 pCi/L.
- When radon in well water is below 4,000 pCi/L, you should retest air and water every three to five years.

REDUCING HEALTH RISK

The U.S. Surgeon General and USEPA recommend testing for radon in air in all living spaces below the third floor. The U.S. Congress has set a long-term goal that indoor air radon levels be no more than outdoor levels, which average around 0.4 pCi/L. While this goal is not yet technologically achievable in all cases, radon in most homes today can be reduced to 2 pCi/L or below and EPA strongly recommends treatment when the radon indoor air concentration exceeds 4 pCi/L. Approximately 27,000 cancer deaths can be expected for every 1 million persons exposed for a “lifetime” (70 years) at 4 pCi/L. Radon mitigation is achieved mainly through reducing the passage of radon through foundations and, in some cases, treating bedrock well water to remove radon.

TESTING FOR RADON

Testing for Radon in Air – Granite State Analytical Services has long offered radon in the air testing. Radon in air results are presented in pCi/L with the calculated uncertainty in the following format: Radon result \pm Uncertainty. This means that the actual radon level present is between Result - Uncertainty and Result + Uncertainty. This will give a better representation of the homeowner’s actual radon exposure.

Testing Water for Radon – Radon concentrations in well water can vary substantially from one test to another. NHDES recommends at least two radon tests (at least one month apart when possible), prior to making any treatment decisions. Because radon is not the only potentially harmful radioactive substance commonly found in New Hampshire well water, NHDES also recommends testing water from private bedrock wells for uranium and analytical gross alpha; some laboratories offer these tests as a package along with radon. A well that has high levels of radon is more likely to have high levels of uranium and/or gross alpha.

Granite State Analytical Services has long offered radon in water testing. Radon in water results are presented in pCi/L with the calculated uncertainty in the following format: Radon result \pm Uncertainty. This means that the actual radon level present is between Result - Uncertainty and Result + Uncertainty. This will give a better representation of the homeowner’s actual radon exposure.

Radon Measurement and Mitigation Service Providers and Equipment Suppliers

Since January 1, 2015, all *radon-in-air mitigation* designers and installers must be nationally certified to perform those services in New Hampshire. Certification is *not* required for radon-in-air testing or for radon-in-water treatment, but some radon-in-air testing providers are nationally certified. Certified radon service providers can be found at www.nrsb.org and www.nrpp.info. Suppliers of radon water treatment devices can be found on the internet and in the *Yellow Pages* under listings for “Water Treatment,” “Water Conditioning,” or “Radon Testing & Services.”

ADDITIONAL RESOURCES

- A Citizen's Guide To Radon, The Guide to Protecting Yourself and Your Family From Radon (USEPA, 2012), available at <http://www.epa.gov/radon>
- Information and publications about all aspects of radon at <http://www.epa.gov/radon>
- NHDES Fact Sheet ARD-EHP-22, "Radium, Radon, and Uranium: Health Information Summary," available at <http://des.nh.gov/organization/commissioner/pip/factsheets/ard/documents/ard-ehp-22.pdf>
- NHDES Fact Sheet GEO-2, "Radon in New Hampshire," available at <http://des.nh.gov/organization/commissioner/pip/factsheets/geo/documents/geo-2.pdf>
- Risk Assessment of Radon in Drinking Water (National Academy of Sciences, 1999), available at <http://www.nap.edu>