



U.S. ENVIRONMENTAL PROTECTION AGENCY

## Ground Water & Drinking Water

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# Radon in Drinking Water: *Questions and Answers*

## What is radon?

Radon is a gas that has no color, odor, or taste and comes from the natural radioactive breakdown of uranium in the ground. You can be exposed to radon by two main sources: (1) radon in the air in your home (frequently called "radon in indoor air") and (2) radon in drinking water. Radon can get into the air you breathe and into the water you drink. Radon is also found in small amounts in outdoor air.

Most of the radon in indoor air comes from soil underneath the home. As uranium breaks down, radon gas forms and seeps into the house. Radon from soil can get into any type of building - homes, offices, and schools - and build up to high levels in the air inside the building.

Radon gas can also dissolve and accumulate in water from underground sources (called ground water), such as wells. When water that contains radon is used in the home for showering, washing dishes, and cooking, radon gas escapes from the water and goes into the air. It is similar to carbonated soda drinks where carbon dioxide is dissolved in the soda and is released when you open the bottle. Some radon also stays in the water.

Radon is not a concern in water that comes from lakes, rivers, and reservoirs (called surface water), because the radon is released into the air before it ever arrives at your tap.

## Why is radon in drinking water a health concern?

Breathing radon in indoor air can cause lung cancer. Radon gas decays into radioactive particles that can get trapped in your lungs when you breathe it. As they break down further, these particles release small bursts of energy. This can damage lung tissue and increase your chances of developing lung cancer over the course of your lifetime. People who smoke have an even greater risk. Not everyone exposed to high levels of radon will develop lung cancer. However, radon in indoor air is the second leading cause of lung cancer. About 20,000 deaths a year in the U.S. are caused by breathing radon in indoor air.

Only about 1-2 percent of radon in the air comes from drinking water. However breathing radon released to air from tap water increases the risk of lung cancer over the course of your lifetime. Some radon stays in the water; drinking water containing radon also presents a risk of developing internal organ cancers, primarily stomach cancer. However this risk is smaller than the risk of developing lung cancer from radon released to air from tap water.

Based on a National Academy of Science report, EPA estimates that radon in drinking water causes about 168 cancer deaths per year: 89% from lung cancer caused by breathing radon released to the indoor air from water and 11% from stomach cancer caused by consuming water containing radon.

## Is there radon in my water?

Not all drinking water contains radon. If your drinking water comes from a surface water source, such as a river, lake, or reservoir, most radon that might be in the water will be released into the air before reaching your water supplier or home. Radon is only a concern if your drinking water comes from underground, such as a well that pumps water from an aquifer, though not all water from underground sources contains radon.

If you get your water from a public water system that serves 25 or more year-around residents, you will receive an annual water quality report. A major public right-to-know initiative of the 1996 Amendments to the Safe Drinking Water Act, these water quality reports will tell you what is in your water (including radon if it has been tested), where it comes from, and how to help protect it.

## What levels of radon in indoor air should I be concerned about?

There is no federal regulation for radon in indoor air. However, EPA does recommend that you take action to reduce your home's indoor radon levels if you test your home and find levels at or above 4 pCi/L (picoCuries per liter, a unit of measurement for radiation). EPA and the U.S. Surgeon General recommend that everyone test their homes (and apartments located below the third floor). In most homes, radon levels can be reduced to 2 pCi/L or less. In addition, new homes should be built radon resistant, especially in high radon areas.

For more information about how to test the air in your home for radon and fix the problem, contact the Radon Hotline at 1-800-SOS-RADON. If you think the radon in your indoor air comes from the water, see "**How do I test for radon and how do I get rid of it?**"

## What levels of radon in water should I be concerned about?

There is currently no federally-enforced drinking water standard for radon. EPA is proposing to regulate radon in drinking water from community water suppliers (water systems that serve 25 or more year-round residents). EPA does not regulate private wells.

EPA is proposing to require community water suppliers to provide water with radon levels no higher than 4,000 pCi/L, which contributes about 0.4 pCi/L of radon to the air in your home. This requirement assumes that the State is also taking action to reduce radon levels in indoor air by developing EPA-approved, enhanced State radon in indoor air programs (called Multimedia Mitigation Programs). This is because most of the radon you breathe comes from soil under the house. This option gives States the flexibility to focus on the greatest problems, by encouraging the public to fix radon in indoor air problems and build homes that keep radon from entering.

For States that choose not to develop enhanced indoor air programs, community water systems in that State will be required to reduce radon levels in drinking water to 300 pCi/L. This amount of radon in water contributes about 0.03 pCi/L of radon to the air in your home. Even if a State does not develop an enhanced indoor air program, water systems may choose to develop their own local indoor radon program and meet a radon standard for drinking water of 4,000 pCi/L.

EPA has set up this option, under the framework specified by the 1996 Amendments to the Safe Drinking Water Act, so that the overall risks from exposure to radon, both through air and water, are reduced.

## How do I test for radon and how do I get rid of it?

Because radon in indoor air is the larger health concern, EPA recommends that you first test the air in your home for radon before testing for radon in your drinking water. EPA and the U.S. Surgeon General recommend testing all homes for radon in indoor air (and apartments located below the third floor). EPA recommends that you take action to reduce your home's indoor radon levels if your radon test result is 4 pCi/L or higher.

If you have tested the air in your home and *found a radon problem*, you may also want to find out whether your water is a concern:

- **If you get water from a public water system:** Find out whether your water system gets its water from a surface (river, lake, or reservoir) or a ground water (underground) source.
  - *If the water comes from a surface water source*, most radon that may be in the water will be released to the air before it makes its way to your tap.

- *If the water comes from a ground water source*, call your water system and ask if they've tested the water for radon.
- **If you have a private well:** EPA recommends testing your drinking water for radon. Call the Safe Drinking Water Hotline (1-800-426-4791) which can provide phone numbers for your State laboratory certification office or call the Radon Hotline (1-800-SOS-RADON) which can provide phone numbers for your State radon office. Your State laboratory certification office or State radon office can direct you to laboratories which may be able to test your drinking water for radon.

If testing your private well shows that you have high levels of radon in your drinking water and you are concerned about it, there are some things you can do to improve the water. The most effective treatment you can apply is to remove radon from the water right before it enters your home. This is called point-of-entry treatment. There are two types of point-of-entry devices that remove radon from water:

- Granular activated carbon (GAC) filters (which use activated carbon to remove the radon), and
- Aeration devices (which bubble air through the water and carry radon gas out into the atmosphere through an exhaust fan).

GAC filters tend to cost less than aeration devices, however, radioactivity collects on the filter, which may cause a handling hazard and require special disposal methods for the filter.

For more information on aerators and GAC filters, you should contact two independent, non-profit organizations: NSF International at (800) 673-8010 and the Water Quality Association at (630) 505-0160.

## **I receive water from a public water supplier. How will EPA's proposed regulation affect me?**

Your State may decide to develop a plan for an enhanced radon in indoor air program, which would require your public water supplier to reduce radon levels in the water supply to 4,000 pCi/L. Consumers may be interested in participating in their State's development of this plan, once the radon rule is finalized (expected in August, 2000). If your State or public supplier does not develop an enhanced radon in indoor air program, your public water supplier is required to reduce radon levels to 300 pCi/L. Under either option, your water bills may increase depending on the size of your water supplier and the radon levels in the drinking water in your area.

## **How do I get more information about radon?**

### **Call the Safe Drinking Water Hotline (1-800-426-4791):**

The Safe Drinking Water Hotline can provide you with more information about what EPA is doing to regulate radon in drinking water and refer you to your State drinking water program for information about your community water system. Or, visit EPA's web site on drinking water at <http://www.epa.gov/safewater/> for more information.

### **Call your Local Water Supplier:**

Your local water supplier will have information about your local water supply and can answer any questions you have about your water. Look for the phone number on your water bill or in the government section of your phone book.

### **Call the Radon Hotline (1-800-SOS-RADON):**

The Radon Hotline can refer you to your State radon office for more information, and can send you free publications about radon in indoor air, including: "A Citizen's Guide to Radon," "The Home Buyer's and Seller's Guide to Radon," and the "Consumer's Guide to Radon," which provide information on how you can test for radon levels in your indoor air and how indoor air radon problems can be fixed. Or, visit EPA's web site on radon at <http://www.epa.gov/iaq/radon/> for more information

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