Radionuclides & PRIVATE WELLS

What are radionuclides?

Radionuclides are elements that give off radiation as they break down. In nature, radionuclides can be found in rocks and soil and can get into ground water and into wells and the air we breathe.

How do radionuclides get into well water?

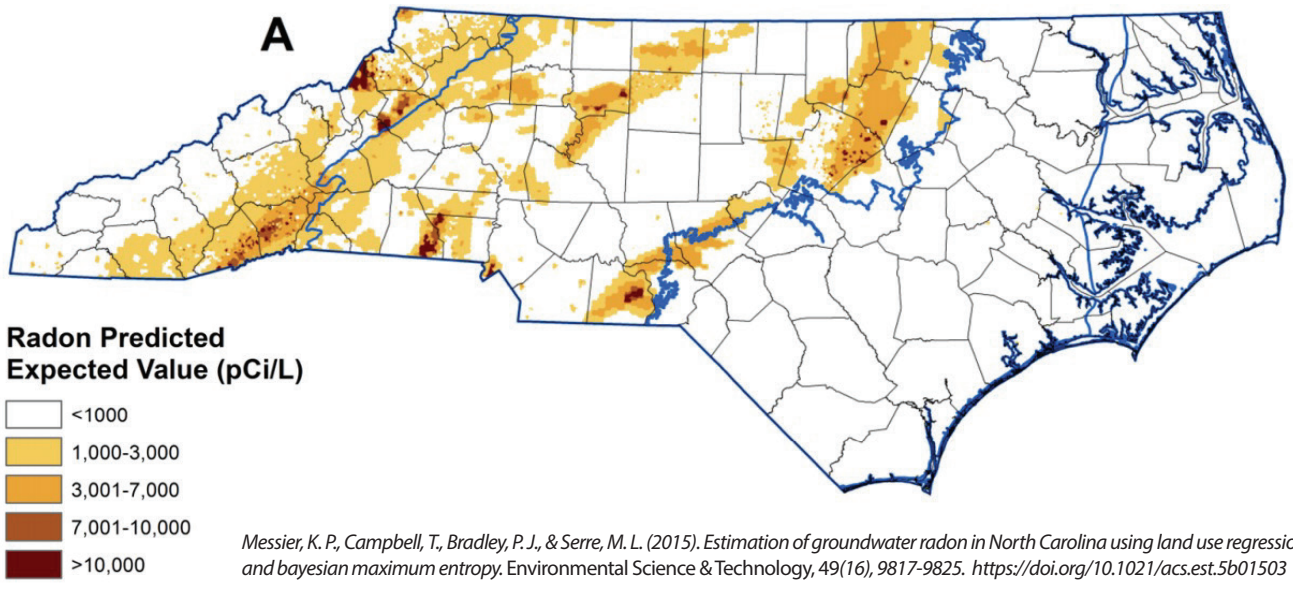
Radionuclides can get into ground water and into wells if you live in an area where they are naturally present in the rocks and soil.

What areas of the state are more likely to have high levels of radionuclides in groundwater?

There are limited data on the occurrence of radionuclides in North Carolina. These elements are associated with certain types of rock formations deep underground. The following map shows areas that are more likely to have elevated radon in groundwater based on the location of these rock formations. Radon co-exists with uranium, radium and other radionuclides, so this map also indicates where other radionuclides might be elevated in groundwater. Areas in or around the colored portions of this map may be impacted by radionuclides.

I don't have a private well. Should I be concerned?

If you receive water from a public water supply (community wells, county systems or municipal systems) your water is regulated by the North Carolina Department of Environmental Quality to ensure your water does not exceed maximum contaminant levels for radionuclides. However, public water supply users may still be at risk from indoor radon in air that comes from other sources besides water.



Messier, K. P., Campbell, T., Bradley, P. J., & Serre, M. L. (2015). Estimation of groundwater radon in North Carolina using land use regression and bayesian maximum entropy. Environmental Science & Technology, 49(16), 9817-9825. *https://doi.org/10.1021/acs.est.5b01503*

Do I need to get my home tested for radon in the air?

Yes. The North Carolina Radiation Protection Section recommends that all homes and buildings in North Carolina are tested for radon. Radon is a gas that can enter your home through your floors/foundation and from radon dissolved in groundwater. Testing for radon is important because breathing radon in indoor air can cause lung cancer.

You can purchase a test kit through the NC Radon Program at www.ncdhhs.gov/divisions/health-service-regulation/north-carolina-radon-program/testing-radon. For more information, contact the NC Radon Program at Phillip.gibson@dhhs.nc.gov.

What health problems are associated with radionuclides?

The health effects of radionuclides depend on which radionuclides you are exposed to. Generally, drinking water with elevated radionuclides has been linked to adverse health effects and cancer.

- Radon exposure has also been linked to stomach cancer.
- Uranium exposure has been linked to kidney damage and cancer.
- Radium exposure has been linked to bone cancer.

Breathing air with elevated radon levels is the second leading cause of lung cancer, after cigarette smoke. If contaminant concentrations in your well water are elevated, you can contact the Occupational and Environmental Epidemiology Branch (OEEB) in the North Carolina Department of Health and Human Services at (919) 707-5900. The OEEB can answer questions regarding potential health effects and possible actions to reduce the levels of the contaminant(s) in your well water.

What should I test my well for?

If you live in an area susceptible to elevated levels of radon in groundwater or have other concerns about radionuclides, we suggest that you initially screen your well water for: gross alpha, gross beta, uranium, and radon.

You may additionally test your well for radium 226/228 if you still have concerns about radionuclides after reviewing your initial radionuclide results.

If I want to get my well tested, where can I go?

If you live in Wake County, contact the Wake County Environmental Health Department at

919-893-WELL or visit wakegov.com/wells.

If you live in Franklin County, contact Franklin County Environmental Health Department at 919-496-8100.

If you are not a resident of Franklin or Wake counties, contact a certified laboratory. Here is a list of all the private labs that are certified by the NC State Laboratory of Public Health to test for uranium, radon, gross alpha and gross beta – all the radionuclides of concern – as of July 2022:

LAB NAME	STATE	ADDRESS	PHONE NUMBER
Aqua Pennsylvania, Inc.	PA	762 W. Lancaster Ave. Bryn Mawr, PA 19010	(610) 645-1063
EMSL Analytical, Inc.	NJ	200 Route 130 North Cinnaminson, NJ 08077	(800) 220-3675
Environment 1	NC	114 Oakmont Drive Greenville, NC, 27858	(252) 756-6268
Enco Laboratories-Cary	NC	102-A Woodwinds Industrial Ct Cary, NC 27511	(919) 467-3090
Environmental Chemists, Inc.	NC	6602 Windmill Way Wilmington, NC 28405	(910) 392-0223
Eurofins Eaton Analytical, Inc.	CA	750 Royal Oaks Drive Suite 100 Monrovia, CA 91016	(626) 386-1100
Eurofins Eaton Analytical, Inc. - South Bend	IN	110 South Hill St. South Bend, IN 46617	(574) 233-4777
Florida Radiochemistry Services, Inc.	FL	5456 Hoffner Ave., Suite 201 Orlando, FL 32812	(407) 382-7733
GEL Laboratories, LLC	SC	2040 Savage Road Charleston, SC 29407	(843) 556-8171
National Testing Laboratories, LTD.	MI	556 South Mansfield St. Ypsilanti, MI 48197	(734) 483-8333
NSF International	MI	789 N. Dixboro Road Ann Arbor, MI 48105	(734) 769-8010
Pace Analytical Services - Pittsburgh PA	PA	1638 Roseytown Rd Suites 2, 3 & 4; Greensburg, PA 15601	(724) 850-5600
Pace Analytical Services - Tennessee	TN	12065 Lebanon Road Mt Juliet, TN 37122	(615) 773-9737
Pace Analytical Services - Florida	FL	8 E Tower Circle Ormond Beach, FL, 32714	(386) 672-6668
Summit Environmental Technologies Inc.	OH	3310 Win Street, Cuyahoga Falls, OH 44223	(330) 253-8211

This is not an endorsement for any specific laboratory. This information can be found at: https://slphreporting.ncpublichealth.com/Certification/CertifiedLaboratory.asp

What should I do if the tests find radionuclides in my well water?

There are treatment systems that can get rid of radionuclides in water; the type of system depends on the kind of radionuclide.

TREATMENT	URANIUM	RADIUM	RADON	GROSS ALPHA	GROSS BETA
Ion Exchange*	X	X			X
Reverse Osmosis	X	X		X	X
Surface and Decay Storage			X		
Aeration System			X		
Granular Activated Carbon			X		

*The type of ion exchange depends on contaminants detected and location of treatment system (point-of-entry or point-of-use).

How much will it cost to fix the problem if tests find radionuclides in my well water?

If the testing indicates problems, it could cost anywhere from $1,000 to $15,000 to install the treatment system. The cost will depend on what the testing indicates and what approach you want to take to fix it.

To discuss options, you can contact the Occupational and Environmental Epidemiology Branch (OEEB) in the NC Department of Health and Human Services at (919) 707-5900. The OEEB can provide guidance and recommendations for treatment options to reduce contaminants detected in your well water.

What should I do if I think my health has been affected by contaminants identified in my test results?

If you think your health has been affected by contaminant(s) identified in your well water, talk with your doctor about your specific concerns and show them your well water results.