EXAMPLE - 1 LINE

U.S. EPA Radon Zone Maps

Bureau Of Radiation Protection
October 7, 2025

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EPA Radon Zone Maps

Sections 307 and 309 of the 1988 Indoor Radon Abatement Act (IRAA) directed EPA to produce a map showing indoor radon potential of the United States.

Designed to assist national, state, and local governments, and organizations to target their radon program activities and resources.

Help target radon resistant building practices.

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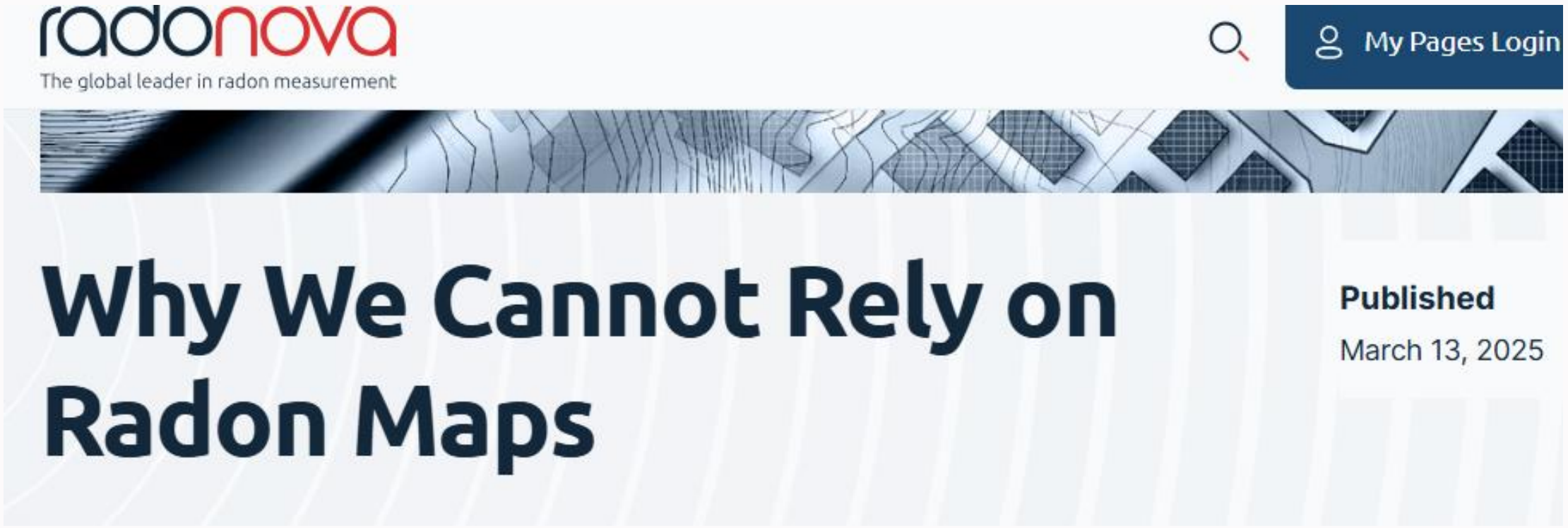
EPA Radon Zone Maps



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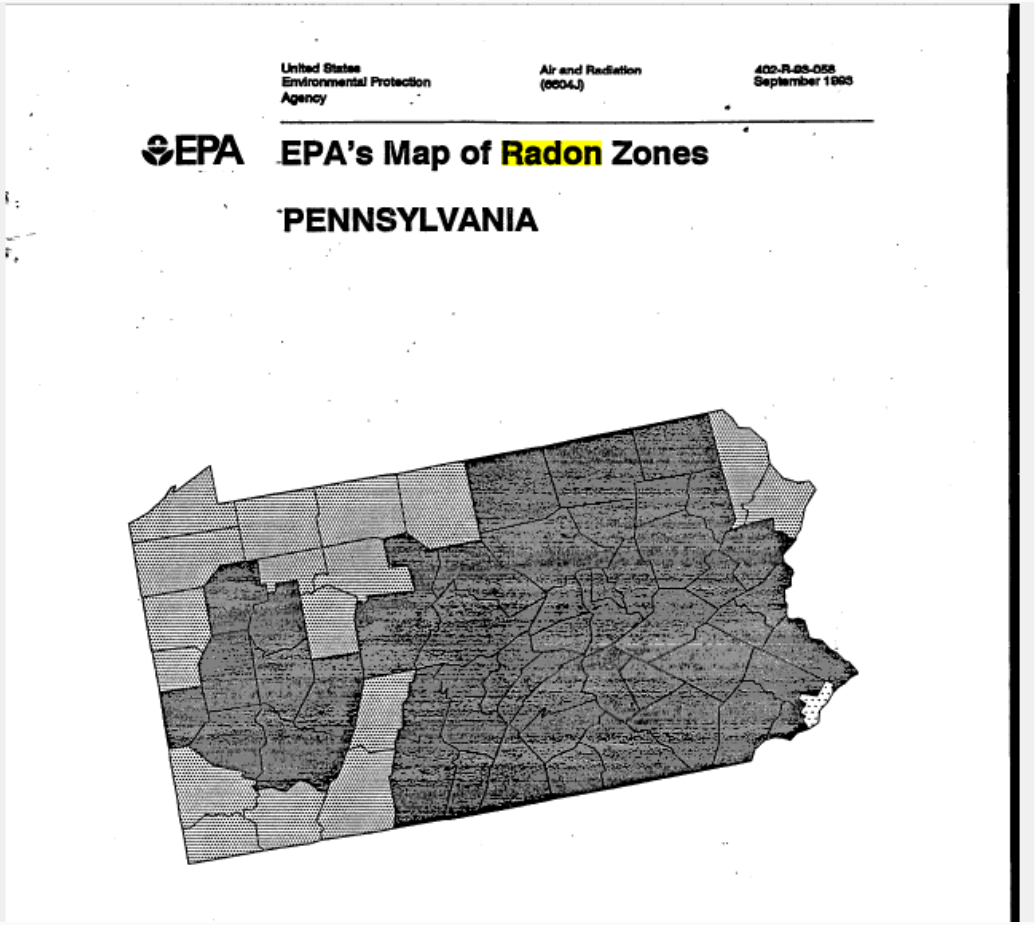
EPA Radon Zone Maps

EPA Maps of Radon Zones and Supporting Documents by State

This page provides EPA Maps of Radon Zones by state along with background documents addressing the development of the map for each individual state, including the data sources used, the conclusions and confidence levels developed for the prediction of radon potential, and the review process that was conducted to finalize the effort.

EPA Map of Radon Zones by State	Supporting Document for Map of Radon Zones
Alabama - EPA Map of Radon Zones (pdf) (23.1 KB)	EPA's Map of Radon Zones Alabama
Alaska - EPA Map of Radon Zones (pdf) (23.92 KB)	EPA's Map of Radon Zones Alaska
Arizona - EPA Map of Radon Zones (pdf) (16.16 KB)	EPA's Map of Radon Zones: Arizona



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EPA Radon Zone Maps

A joint EPA and USGS effort in 1987 resulted in a map, “Areas with Potentially High Indoor Levels.”

See next slide.

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USGS Radon Potential Map

- The map was based on identification of 360 geologic provinces.
    - At this time the map was based soley on limited geologic information.
    - There were few radon measurements yet available (1987)

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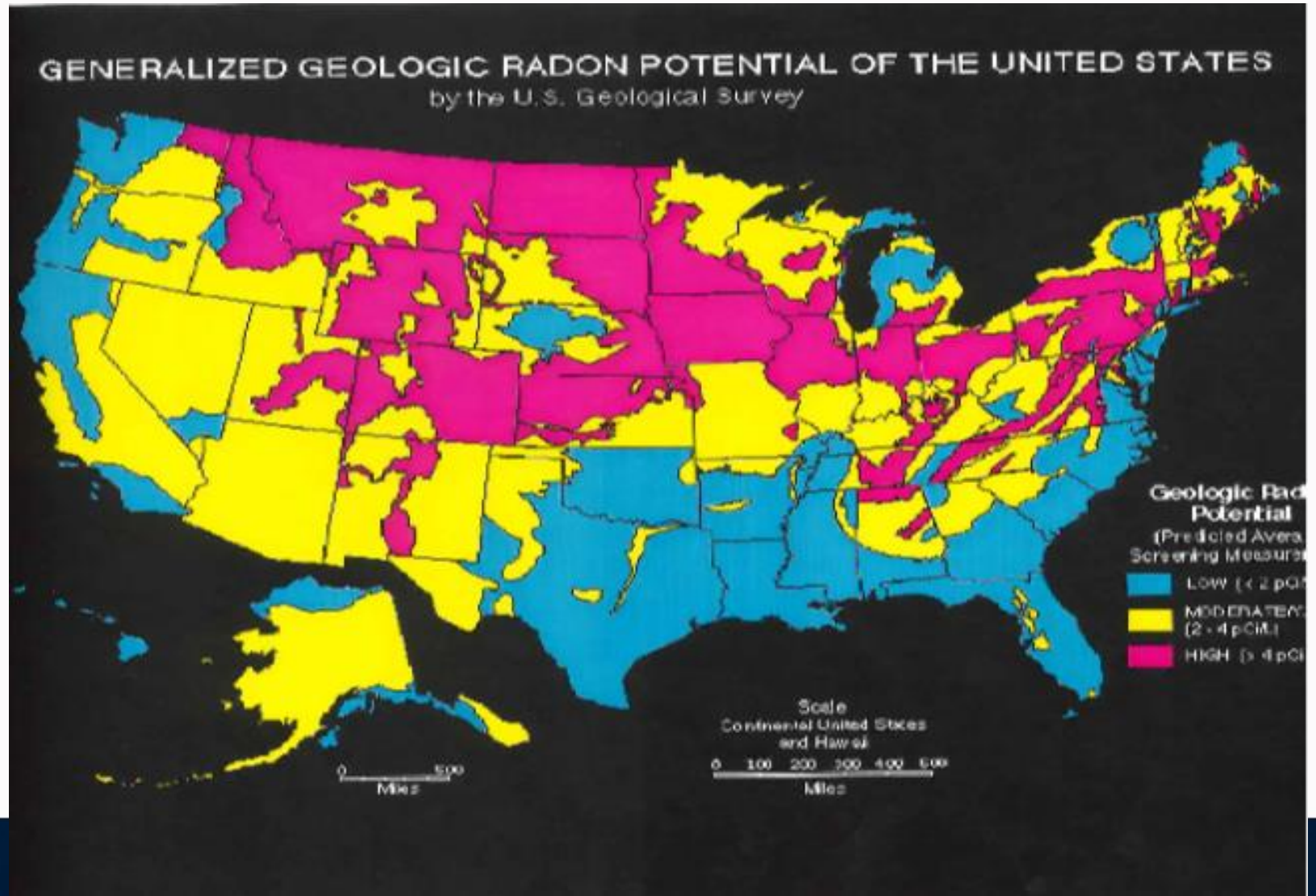
USGS Radon Potential Map



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EPA Radon Zone Maps

- The development of the Zone Map was then based on the USGS Map plus additional factors incorporated and others that became available.
    - Indoor radon measurements (six years of data now available)
    - Geology
    - Aerial radioactivity
    - Soil parameters
    - Foundation types

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EPA Radon Zone Map

- Each of these five factors are associated with assessing indoor radon potential.
- Additionally, data are available for each of these factors in each geologic province.
- Now for explanation of the five factors-

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Radon Data:

Used State Residential Radon Survey (SRRS) data. 42 states completed this data from 1986-1992. Used 2-7 day charcoal test kits, lowest livable level of home. About 60,000 homes across U.S. tested in SRRS.

Individual state data, and University of Pittsburgh data (175,000 tests). Mostly screening Measurements. Used “best” data set.

Univ. of Pittsburgh data used for Oregon and South Dakota and to “fill in the gaps.”

In total more than 100,000 homes used in assessment for map.

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Geology:

Looked at surficial and bedrock geology for radon potential-High uranium content, radon emanation, and mobility.

Looked at some structural features, most notably faults and shear zones. These sites are often associated with localized uranium deposits.

Boyertown, PA and Clinton, NJ are associated with a sheared fault.

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EPA Radon Zone Maps

National Uranium Resource Evaluation (NURE) Aerial Radioactivity :

A 1970-1980's U.S. DOE evaluation for uranium resources/deposits.

Airplane flies 400' above ground, measures upper 12" of Bi-214 content of soil and rocks.

Calibrated to estimate U-238 in ppm. This can then be expressed in terms of radium, whereby 3 ppm eU equals 1 pCi/g Ra-226.

Provides an estimate of radon source strength.

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In Anthracite Region

Uranium Search Is On

By DAN CUPPER
Staff Writer

UNIVERSITY PARK — One of Pennsylvania's great energy-producing areas of the past — the anthracite region — may come into its own again as a source of uranium.

Dr. Arthur W. Rose, a Pennsylvania State University professor of geochemistry, is "prospecting" in several parts of the state as part of a federally funded research project. And the most promising spot, he says, is a trio of sites near Jim Thorpe in central Carbon County.

"I think there are possibilities for sizable deposits there — and you have to emphasize 'possibilities' — because you never know what ore deposits you will find," he said.

"But this looks to me like the most favorable area."

Along with two graduate students, Rose is conducting a research study whose aim is to improve uranium-finding methods and, as a result, to help determine whether enough uranium might lie underground to make mining worthwhile.

Known domestic uranium reserves could be depleted in as little as 10 years, Rose said. The need for uranium as a fuel, he said, "depends on the nuclear power industry. If it is expanded the way it originally was growing, it could be a shorter time than that. If no more reactors are built, that figure may be about right."

The two-year, $60,000 research contract, which will end in December, is funded by the Department of Energy under the National Uranium Resource Evaluation program.

It is the third in a series of federal contracts held by the College of Earth and Mineral Sciences, Rose said. Two others — dating to 1974, "when the uranium business became rejuvenated as a result of petroleum price increases" — focused on analysis of stream mud and ground water.

In the current study, rock samples are broken down in an attempt

See URANIUM — Page 2

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Soils:

Looked at permeability, moisture content, topography, and drainage.

Low permeability soils generally have low radon potential compared to higher permeability soil for a given radium concentration.

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EPA Radon Zone Maps

House Characteristics:

Homes with basements generally provide for more radon entry points, have more pronounced stack effect, and typically have lower air pressure relative to the surrounding soil than non-basement homes.

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EPA Radon Zone Maps

- The EPA Zone map then evolved because the original map was not based upon political borders and about six years of additional SRRS data became available.

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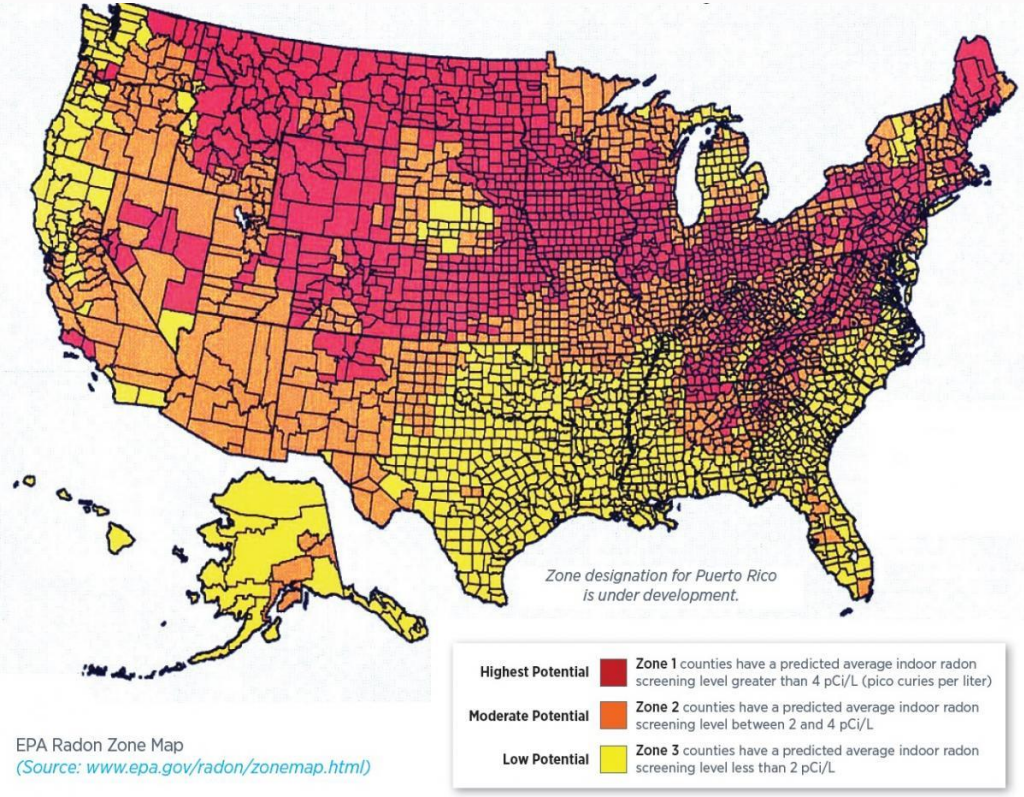
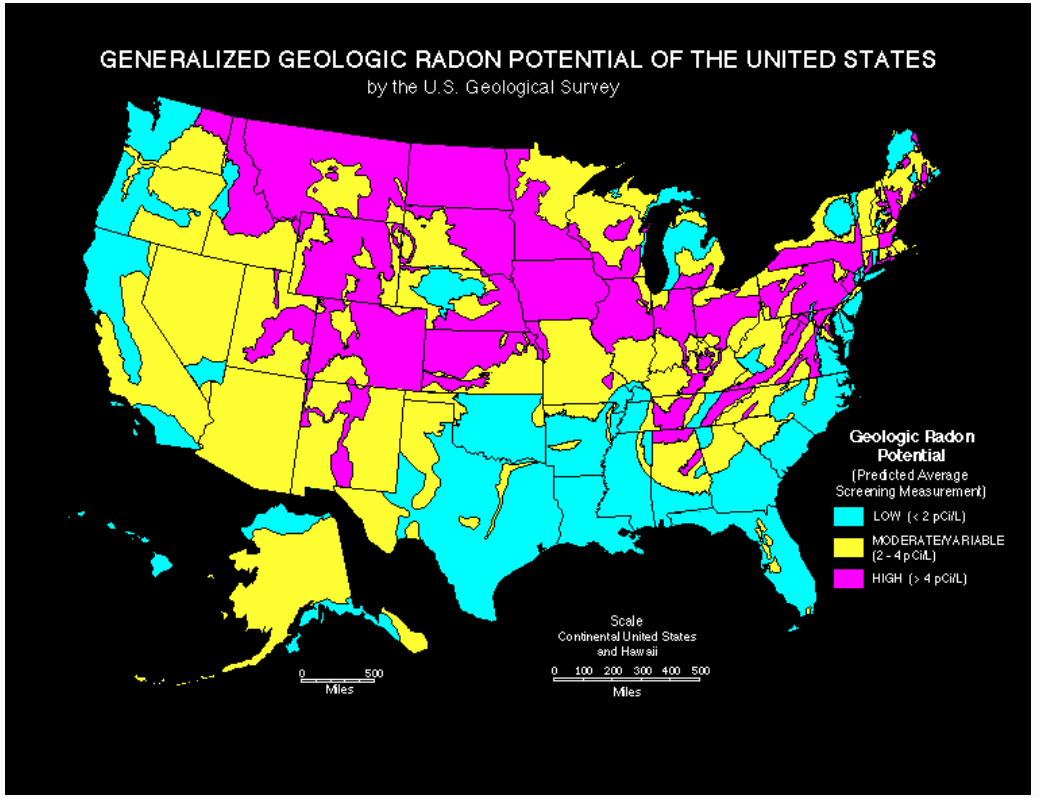
USGS Radon Potential Map and EPA Radon Zone Map



EPA Radon Zone Map
(Source: www.epa.gov/radon/zonemap.html)



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EPA Radon Zone Maps

- Designate all U.S. counties by zone:
  - Zone 1 (red)- Average predicted indoor Rn screening potential > 4 pCi/L

    (In PA 47 Zone 1 counties)

  - Zone 2 (orange)- Avg. predicted indoor Rn potential between 2-4 pCi/L

    (In PA 19 Zone 2 counties)

  - Zone 3 (green)- Average predicted indoor Rn potential < 2 pCi/L

    (In PA 1 Zone 3 county (Philadelphia)

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EPA Radon Zone Maps

How the Zones were established/ranked.

1. Indoor radon data
2. Geology
3. Aerial radioactivity (NURE)
4. Soils
5. Housing foundation type

The above factors are ranked (scored) and confidence level assigned to each.

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EPA Radon Zone Maps

- Radon Index and Confidence Index used to rank areas
  - Radon Index used to rank radon potential for an area
  - Confidence Index is a level of confidence for a given RI based on the quantity and quality of the data. The Confidence Index also has a scoring matrix but not presented here.

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EPA Radon Zone Map-Scoring

Radon Index Point Value,	Increasing Radon Potential		
Factor	**1 point**	**2 points**	**3 points**
Avg. Indoor Radon Conc.	< 2 pCi/L	2-4 pCi/L	>4 pCi/L
Aerial Radioactivity	<1.5 ppm eU	1.5-2.5 ppm	>2.5 ppm
Geology	Negative	variable	Positive
Soil Permeability	low	moderate	High
House Characteristics	Mostly slab	Mixed	Mostly basement

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EPA Radon Zone Maps

scoring method continued,

Geologic Field Evidence Supportive:

- High: +2 pts
- Moderate: +1 pt
- Low: -2 pts
- No relevant field studies: 0 pts

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EPA Radon Zone Maps

Radon Potential	Point Range	Probable Indoor Rn. Avg.
Low (Zone 3)	3-8 points	< 2 pCi/L
Moderate (Zone 2)	9-11 points	2 – 4 pCi/L
High (Zone 1)	12-17 points	> 4 pCi/L
Possible range of points: 3 to 17		

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EPA Radon Zone Maps

The Radon Index and Confidence Index give a general indication of relative contributions of the interrelated geologic factors influencing radon generation and transport in rocks and soils, thus the radon potential of a given area.

Test your home for Radon!

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EPA Radon Zone Maps

- Radon Zone Map Validation:
  - Used counties with > 100 Rn measurements, n= 173 counties
  - Took arithmetic average of measurements, i.e. Avg. = 5.4 pCi/L
  - Compared that to Zone designation, i.e. Zone 1
  - Matches!

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EPA Radon Zone Maps

- Therefore: 116 counties match, 35 counties did not match but had more conservative zone (avg- 3.5 pCi/L Zone 1), finally 22 counties did not match and had less conservative zone (avg- 2.8 pCi/L Zone 3) .

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EPA Radon Zone Maps

- Do we still need the EPA Radon Zone Maps?

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EPA Radon Zone Maps

- States that have their own maps:
  - Florida
  - California
  - New York
  - New Jersey
  - Utah
  - Michigan
  - Pennsylvania

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PA Radon Zone Map-1993

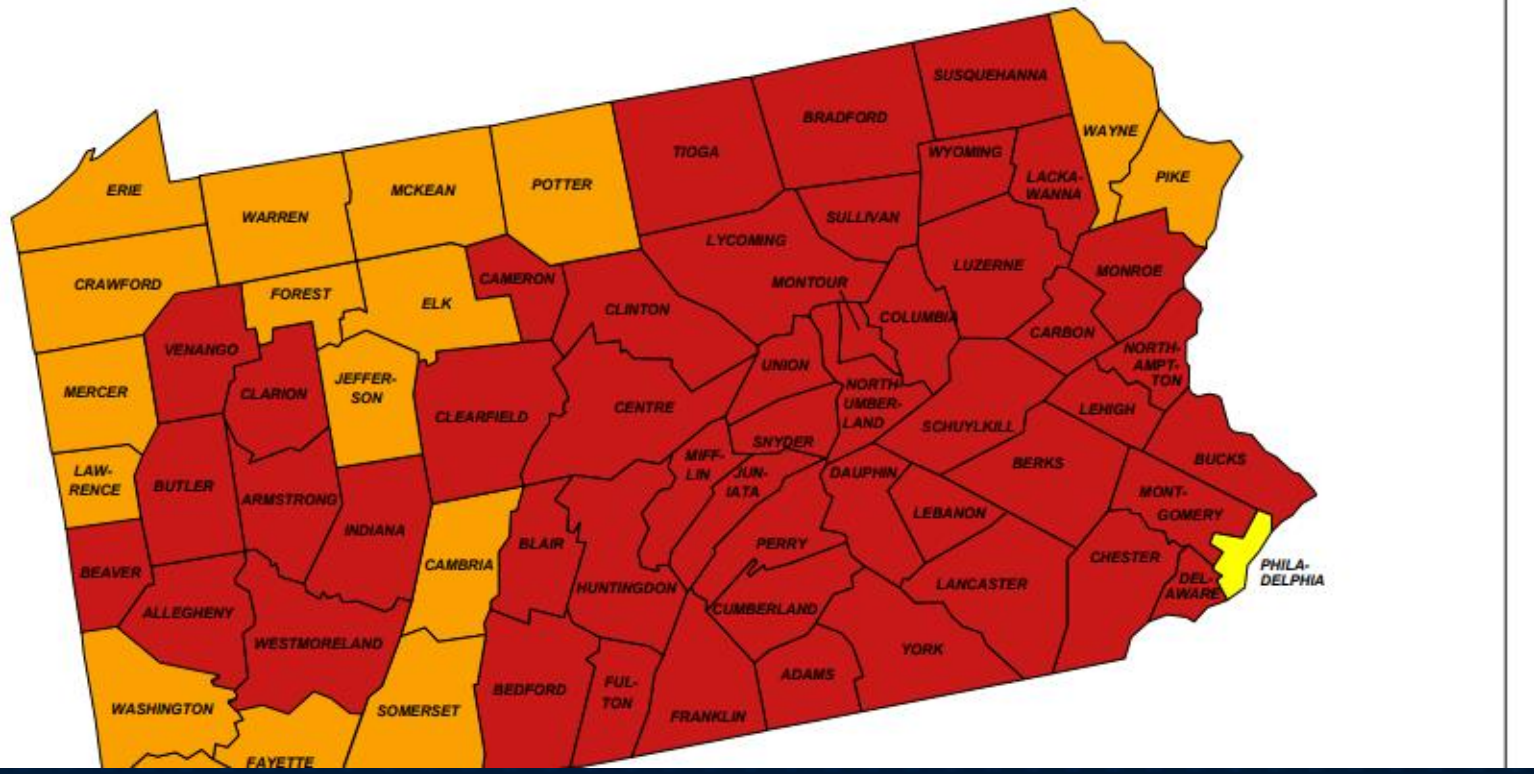
PENNSYLVANIA - EPA Map of Radon Zones

http://www.epa.gov/radon/zonemap.html

The purpose of this map is to assist National, State and local organizations to target their resources and to implement radon-resistant building codes.

This map is not intended to determine if a home in a given zone should be tested for radon.

All homes should be tested, regardless of zone designation.



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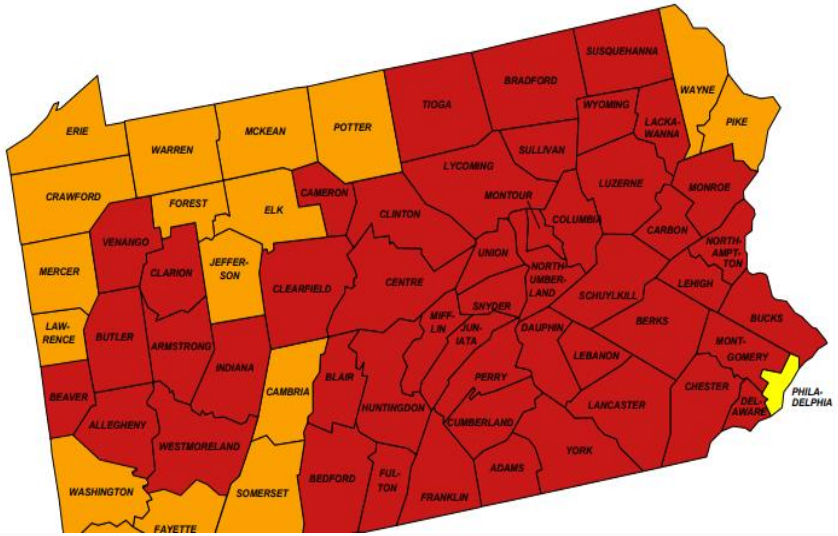

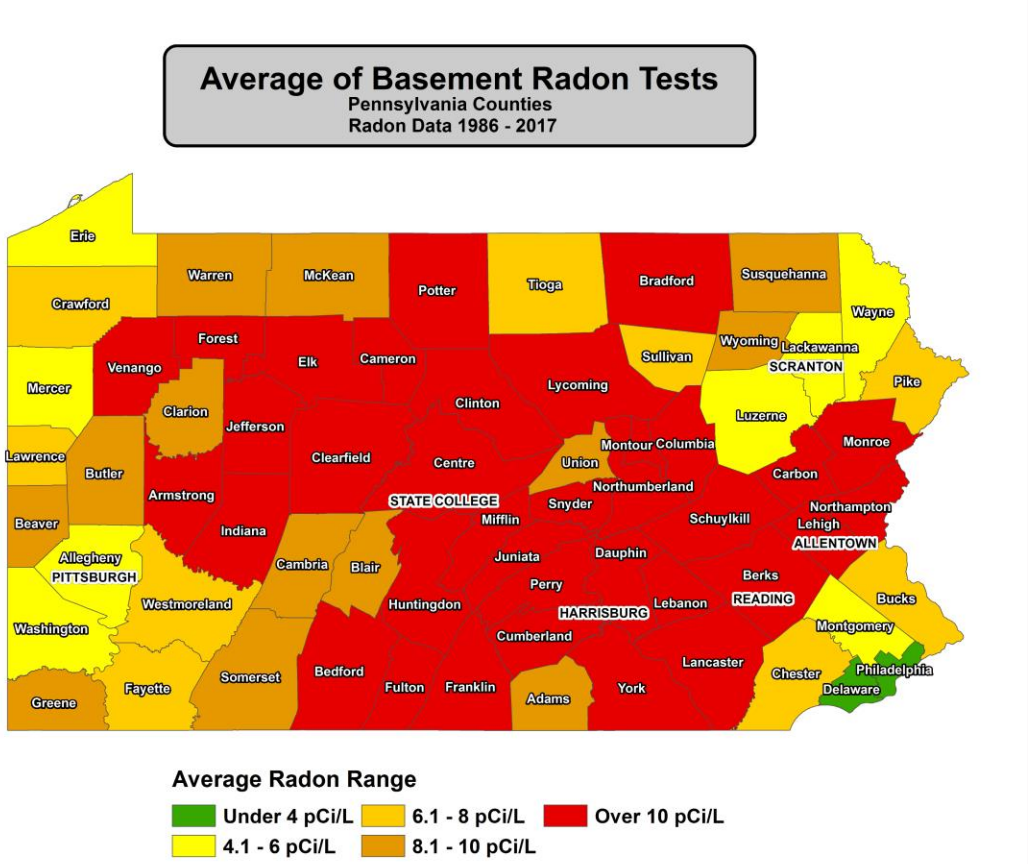

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Take Home Points

- At least for states with ample radon data the Zone Map is probably not needed anymore.
- The EPA Zone map did do a good job of predicting with early and limited data.
- The Zone map is not intended to replace radon testing.

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Get In Touch

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