U.S. EPA Region III Stakeholder Meeting

Robert Lewis
Bureau of Radiation Protection
September 2025

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Radon Division Staff

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PA Student Radon Poster Contest

- Participated in the fifth annual PA student radon poster contest.
- Contest for children between the ages of 9-14.
- Raised awareness of the effects of indoor radon gas and the importance of testing your home for radon.
- Enters the first-place poster into the National Radon Poster Contest sponsored by the Conference of Radiation Control Program Directors.

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American Lung Association Activities

The Radon division partnered with the American Lung Association (ALA) to:

- Mail 40,000 letters to residents in high-radon areas.
- Distribute over 6,000 radon test kits at outreach events.
- Analyze the results of approximately 1,700 test kits.
  - 900 of the test kits were from target areas and 750 test kits were from non-target areas.

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Radon Levels of Target Areas

Targeted Area	Non-targeted Area
56% were greater than 4 pCi/L	38% were greater than 4 pCi/L
18% were greater than 20 pCi/L	6.5% were greater than 20 pCi/L
7% were greater than 50 pCi/L	1.6% were greater than 50 pCi/L
3.3% were greater than 100 pCi/L	0.4% were greater than 100 pCi/L

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Radon Division's Newborn Program

- Replaced the parent's edition of the PA Resident's Guide to Radon with a one-page flyer.
- Postage issues caused many of the certificates to be returned to us as undeliverable. We had a low return rate averaging 12-15 per month.
- Parents now use the QR code on the one-page flyer to order test kits. We average 23-24 requests per month.
- The flyer is more cost efficient, the request is immediate, and we avoid postage costs.

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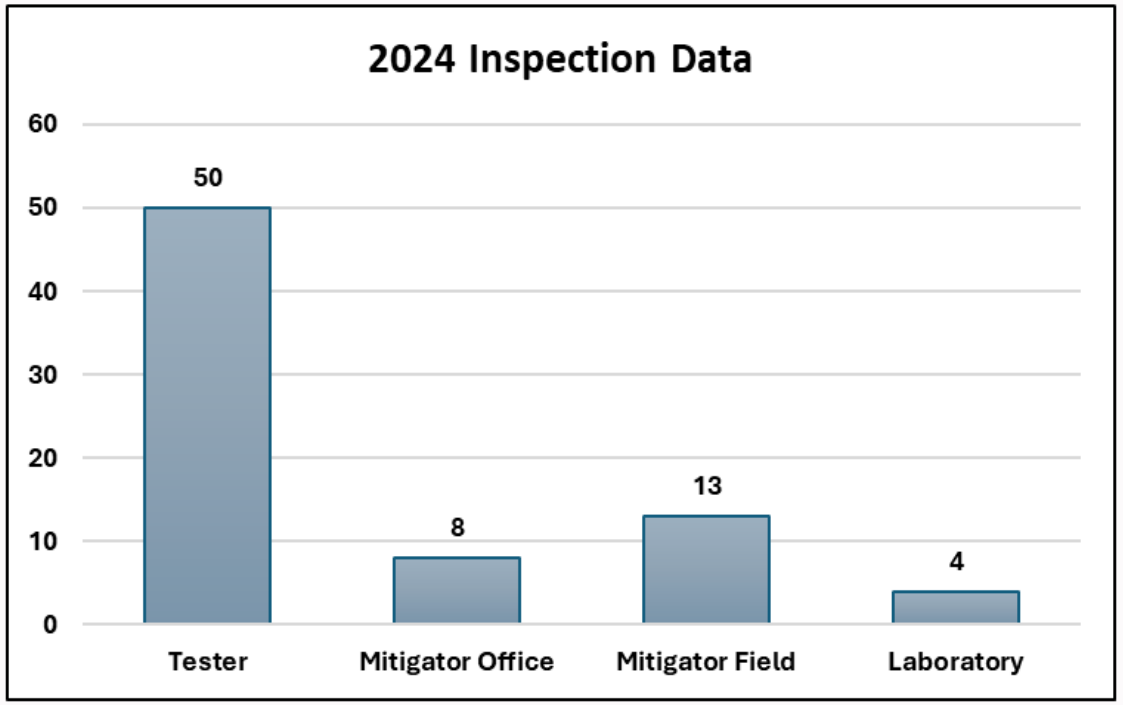
Radon Inspection Data

Testers- 50 inspections
Mitigation Office- 8 inspections
Mitigation Field- 13 inspections
Laboratory- 4 inspections



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2025 Radon Action Month Activities

- Participated in a radio interview with station WLBR in Lebanon.
- Participated in a 30-minute TV interview and answered radon-related questions.
- Kevin Stewart, our partner through ALA, participated in several interviews and wrote several articles related to radon.

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2025 Radon Action Month Activities

- DEP and Dept of Health posted radon information on their websites.
- Division staff member submitted an article about radon that was printed in a daycare newsletter.
- Staff member submitted an article in the PA Association of School Building Officials newsletter.

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TV Interview with WHTM TV

Kevin Stewart, ALA

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Impact

Budget: $70,000

Time Period: January 2025-February 2025

7.6 Million
Impressions Delivered
29% more than planned

43, 884
Total campaign-related ad clicks
12% more than previous year

$5,500
In Added Value

40,167
Landing Page Visits

1.44% click through rate
89% better than the average 0.76%

$.22 cost per click
68% better than the average $0.68

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Radon Re-entrainment Study

Published in the Health Physics Journal, June 2025

Radon Re-entrainment Study—An Initial Investigation

Robert Lewis,[1] Denise Bleiler,[1] Maria Coons,[1] Jamie Ruminski,[1] Ryan Fox,[1] and Bradley Turk[2]

***Abstract*—Currently radon mitigation standards in United States residential homes and buildings require that the exhaust point for active fan-powered depressurization (ASD) systems exhaust be at or above the roofline of the building. There was very little evidence to support this requirement in the mid-1990s when the standards were published. This study was designed to examine the potential and safety of ground level exhaust. There are numerous advantages for ground level exhaust, such as aesthetics, safety, and reduced condensation, if properly placed along side of the building. A configurable exhaust point ASD design whereby we could change the exhaust from roofline to ground level was installed in 10 homes in the Harrisburg, PA, area. This design allowed us to change the configuration every 2 wk from roofline to ground level to baseline (off) conditions, with the house thereby acting as its own control, while extensively measuring the indoor and outdoor radon concentrations and other parameters over the course of 1 y. Over the year-long study, roofline and ground level exhaust configurations both showed very similar average indoor radon concentrations. Apart from the typical seasonal differences, there was little difference between average indoor radon levels for roof and ground level exhaust during each of the four seasons.**
Health Phys. 00(00):00–00; 2025

Key words: ^{222}Rn; ^{222}Rn, indoor; radon; safety standards

entrainment may not be a problem when the exhaust of radon mitigation systems is sensibly located just above ground level.

For example, Neff et al. (1994) performed a wind tunnel study of a model house at a 1:35 scale with exhaust stack configurations representing a penetration through the roof, near the eave by the gutter line, and a ground level exhaust. Both tracer gas and smoke visualization were used to analyze the plume dispersion effects. At an exhaust gas concentration of 37,000 Bq m^{-3}, the highest radon concentration on any side of the house would be 296 Bq m^{-3}. Indoor radon levels were not modeled, nor were actual measurements made.

In an examination of 40 Pennsylvania homes with ASD systems with indoor radon levels still greater than 148 Bq m^{-3}, it was found that these houses had generally very high pre-mitigation indoor radon concentrations ranging from 1,850 to 22,200 Bq m^{-3} and also very high soil gas radon concentrations—in one case the soil gas radon concentration was 1,850,000 Bq m^{-3}. The actual exhaust gas concentrations ranged from 370 to 999,000 Bq m^{-3}, with many in the 37,000 to 74,000 Bq m^{-3} range. In a subset of the 40 homes, 14 had

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Subsequent Post-Mitigation Testing

Radon Post
Card Initiative

Dear Resident:

After a radon mitigation system is installed, it is recommended that a radon test be performed every 2 years. Testing your radon mitigation system confirms that your system is still controlling the radon levels properly. The PA Department of Environmental Protection's database indicates that your radon system was installed at least 2 years ago. With the upcoming colder seasons, this is an ideal time to re-test your home. Use the QR code to find a Pennsylvania-certified individual, firm, or DEP-listed testing firm near you. A radon test kit may also be purchased at local home improvement stores. If you have any questions, please contact us at: 800-237-2366, 717-783-3594 or email us at ra-epradon@pa.gov.

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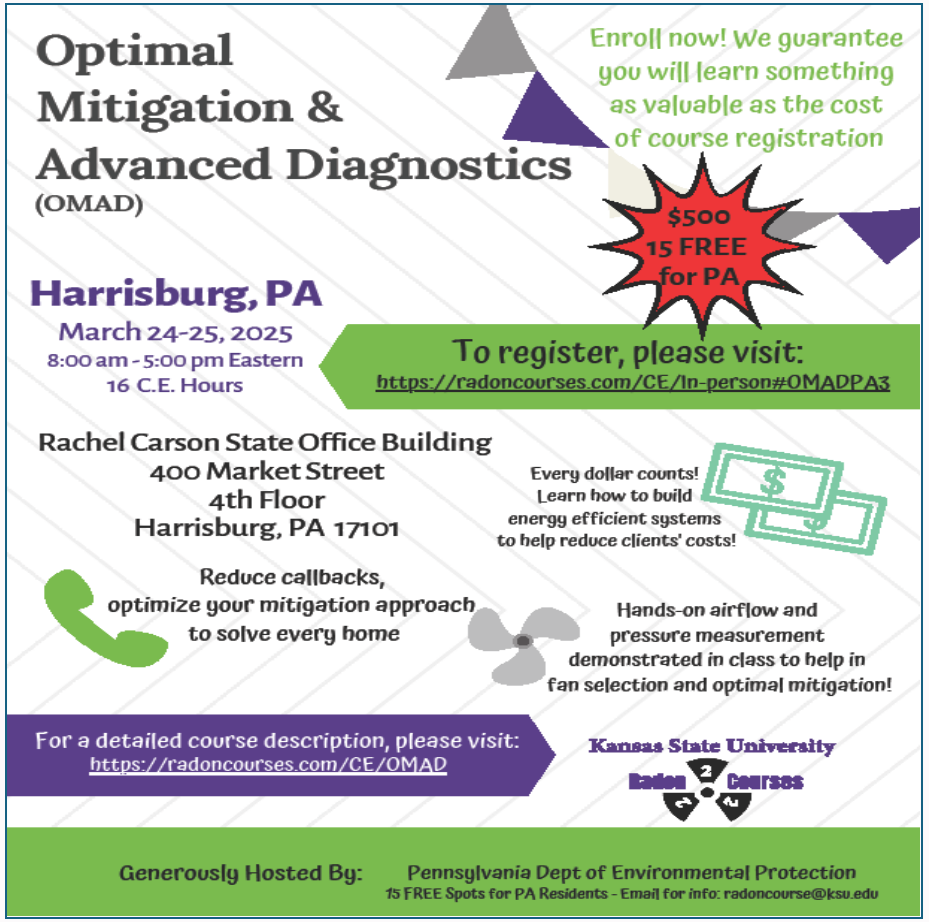
Radon Instructor-Led Course

PA DEP sponsored the Optimal Mitigation & Advanced Diagnostics course taught by Kansas State University (KSU).



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Radon Instructor-Led Course

KSU Instructor, Bruce Snead, teaching students in the Optimal Mitigation & Advanced Diagnostics course.

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County Radon Statistics

Dauphin county basement and first-floor radon levels compared to statewide levels.

Dauphin County Radon Data

Basement

	Dauphin	Statewide Radon Data
Sample Size	58,440	2,316,722
Mean	11.2 pCi/L	6.8 pCi/L
Median	4.5 pCi/L	2.8 pCi/L
Maximum Result	918 pCi/L	6,362 pCi/L

Category	Dauphin	Statewide Radon Data
<4 pCi/L	27,032 (46.3%)	1,439,881 (62%)
4 to 9.99 pCi/L	14,308 (24.5%)	526,909 (22.7%)
10 to 19.99 pCi/L	8,516 (14.6%)	200,151 (8.6%)
20 to 49.99 pCi/L	6,230 (10.7%)	112,106 (4.8%)
50 to 99.99 pCi/L	1,814 (3.1%)	28,338 (1.2%)
>100 pCi/L	540 (0.9%)	9,337 (0.4%)

First Floor

	Dauphin	Statewide Radon Data
Sample Size	11,845	346,311
Mean	5.5 pCi/L	3.6 pCi/L
Median	2.1 pCi/L	1.5 pCi/L
Maximum Result	439 pCi/L	3,013 pCi/L

Category	Dauphin	Statewide Radon Data
<4 pCi/L	8,031 (67.8%)	276,882 (80%)
4 to 9.99 pCi/L	2,243 (18.9%)	46,228 (13.3%)
10 to 19.99 pCi/L	950 (8.0%)	14,434 (4.2%)
20 to 49.99 pCi/L	493 (4.2%)	7,019 (2%)
50 to 99.99 pCi/L	109 (0.9%)	1,367 (0.4%)
>100 pCi/L	19 (0.02%)	381 (0.1%)

Source: PA DEP, Radon Analyzer, 1986 to 2022, all short-term measurements (AC, ES, LS, CR), house types: 2 story, 3 story, bi-level, Cape Cod, contemporary, raised ranch, ranch, split level, townhouse, and unknown.

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County Radon Geology

Draft

Dauphin County – Geology

Dauphin County has serious indoor radon problems, primarily associated with two different groups of geologic formations that trend roughly east-west. Those associated with Ordovician carbonates and shales in a belt between I-81 and US-422 appear to be more serious and widespread on the accompanying porosity map than those associated with portions of the Devonian Catskill Formation farther north in Dauphin County. Likely, however, this appearance is more likely a function of much lower housing density in the northern area.

Beginning in the northern part of Dauphin County, Mifflin, Lykens, Washington, Wiconisco, and Williams Townships have relatively few, recognized very high radon values. This, however, might change as more testing is accomplished. The same appears to be true in Reed Township, but the geology of Reed Township suggests that some very high values will be found there.

Halifax, Wayne and the western portions of Jefferson and Jackson Townships do have very serious radon problems over the Devonian Trimmers Rock Formation olive gray siltstones, the overlying Irish Valley member of the Catskill Formation sandstones, and the overlying Devonian Sherman Creek Member of the Catskill Formation siltstones. In addition, a troublesome belt of Catskill Formation shown within the grayish tan (0.2) color on the accompanying porosity map, presumably enriched in uranium, occurs in Powell Creek Valley roughly between Matamoras on the west and Carsonville on the east. All new and existing structures in this belt should be tested for indoor radon.

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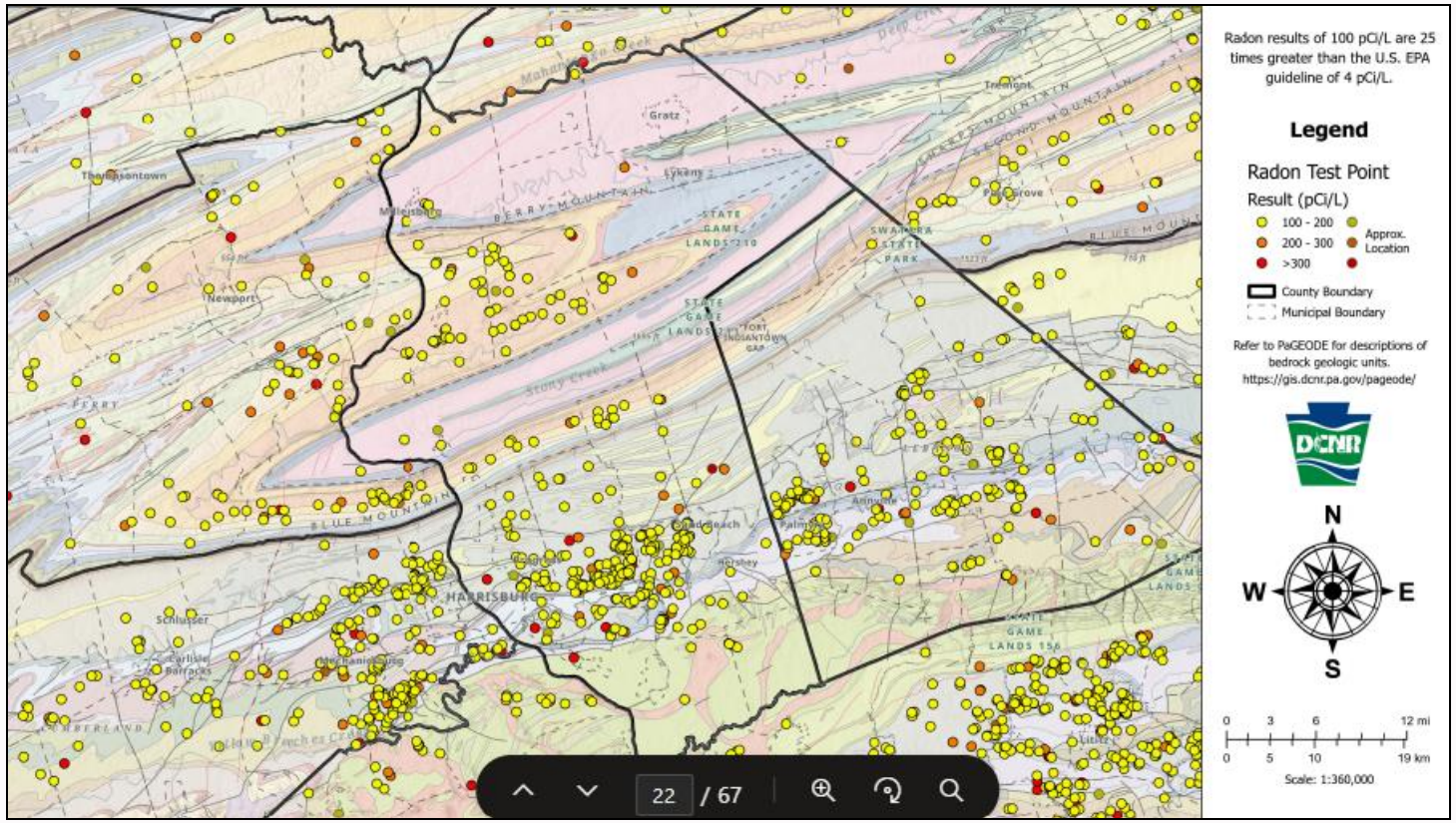
Radon Test Locations Greater Than 100 pCi/L

Results presented are from 1985-2025.



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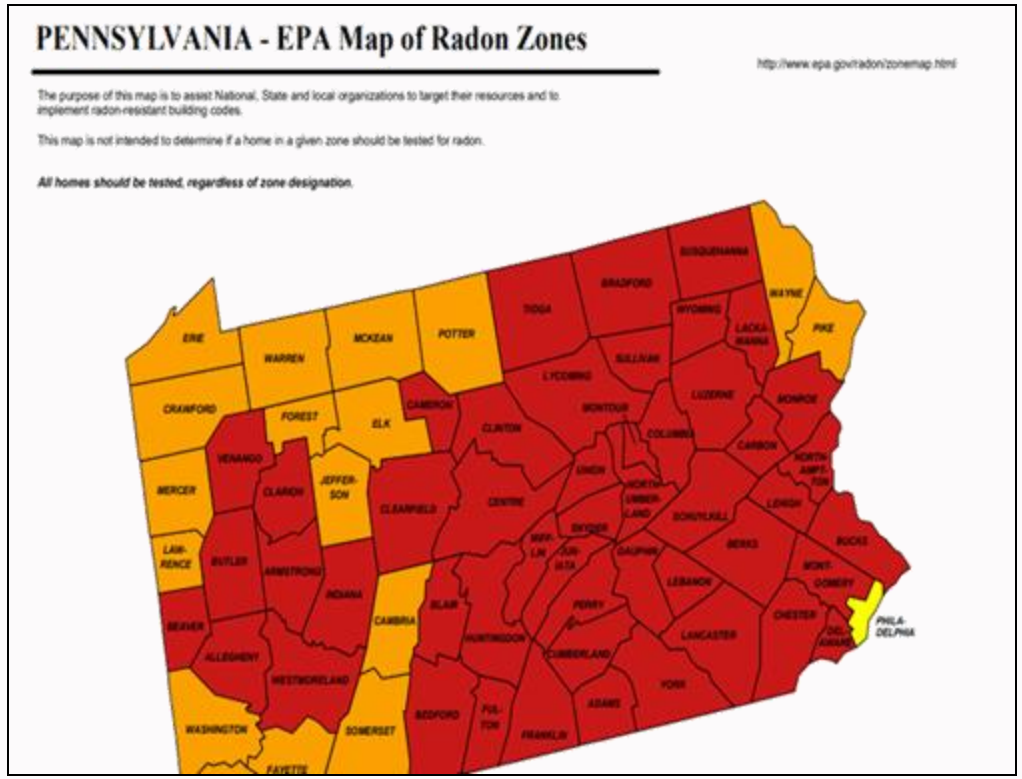
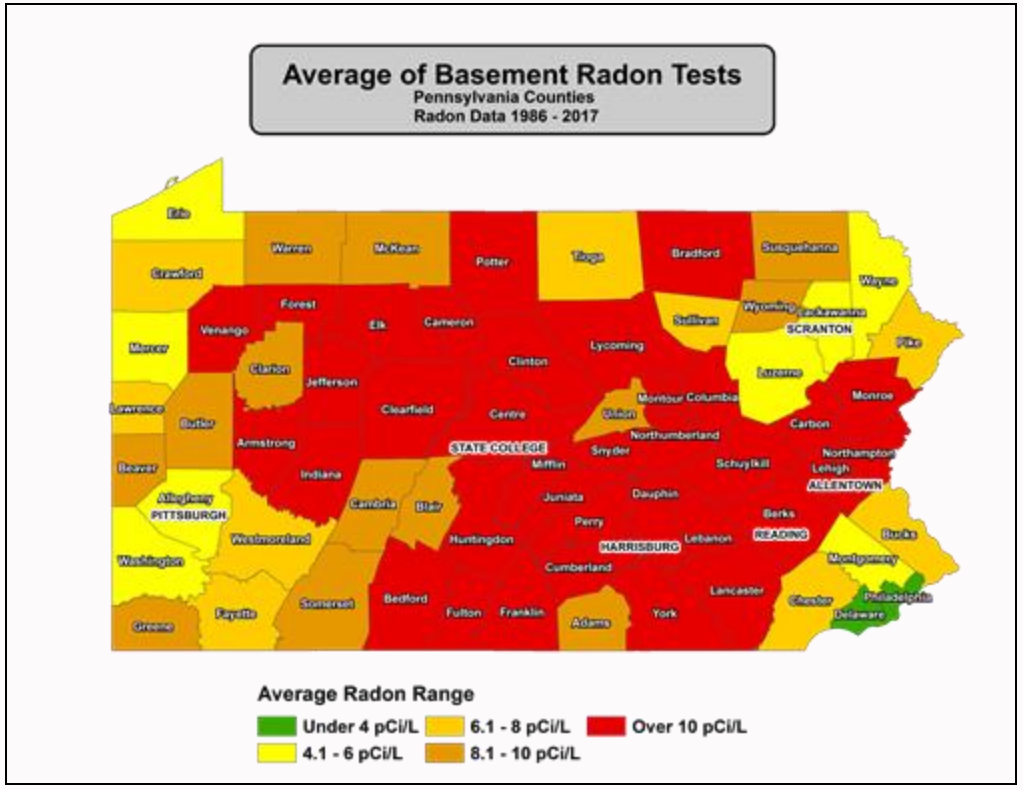
PA Radon Zone Maps





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