

# DHCD Radon Requirement

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VIRGINIA DEPARTMENT OF HOUSING  
AND COMMUNITY DEVELOPMENT  
*Partners for Better Communities*

# Today's presentation

- **What is Radon**
- **DHCD radon process**
- **How radon is tested and mitigated**
- **Documentation requirements**
- **How to budget for your projects**

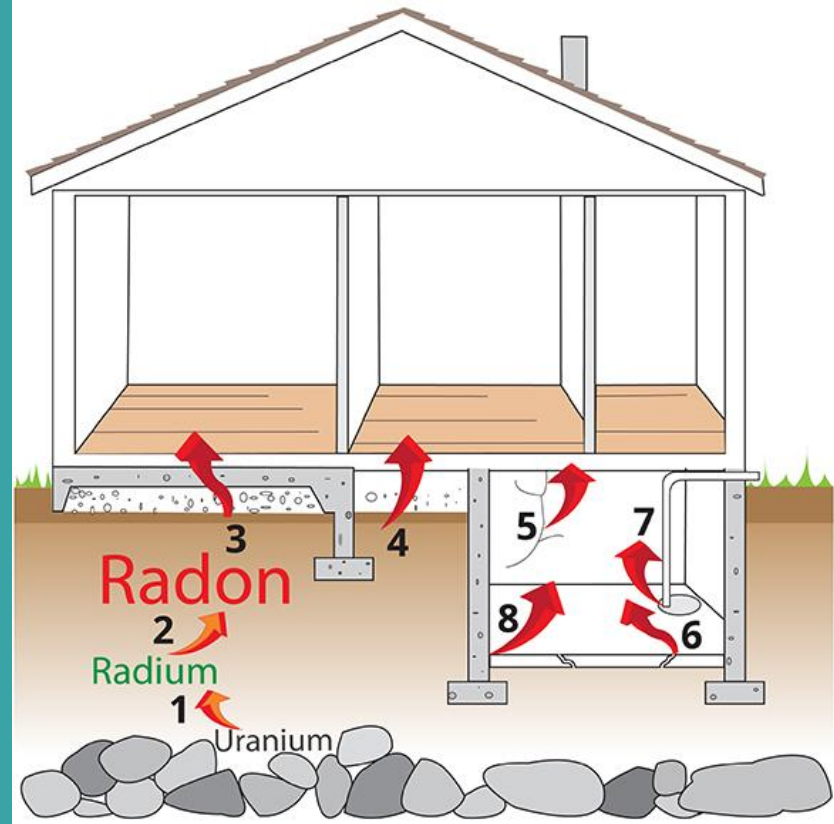
# What is radon?

Radon is a colorless, odorless, tasteless, and chemically inert radioactive gas.

It is formed by the natural radioactive decay of uranium in rock, soil, and water. It can be found in all 50 states.

Testing for it is the only way of telling how much is present.

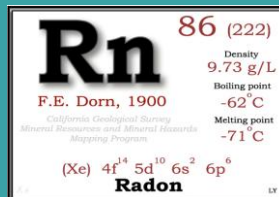
(Source: Kansas State University National Radon Program Services)





## What is radon?

- Is a naturally occurring radioactive decay product of Uranium & has a radioactive half-life of approx. 3.8 days
- Radon's short-lived radon decay products (RDPs) are *solids* that can adhere to dust particles and lung tissue
- Radon emits alpha particles which have limited range/penetrating power, but they can do great damage to lung tissue if inhaled
- The primary health risk associated with radon exposure is an increased risk of Lung Cancer





> 2,700 pCi/L

Levels of radon found in Stanley Watras' home

The recommended safe limit for radon is **below 4 pCi/L**

source: [www.researchgate.net](http://www.researchgate.net)



**pCi/L** picocuries per liter

The standard way to measure radon levels in indoor air

## Radon in homes

- o Mid-1980's
- o Limerick Nuclear Power Plant in eastern Pennsylvania
- o Set off radiation detector upon entering the nuclear power plant
- o They discovered extremely elevated levels of radon in his new home

## Why is radon bad?

- Over time, breathing in high levels of radon can cause lung cancer.
- Radon is the second leading cause of lung cancer deaths in the US after cigarette smoke.
- The EPA and Surgeon General's office estimate radon is responsible for more than 21,000 lung cancer deaths each year in the US. *(Source: CDC)*



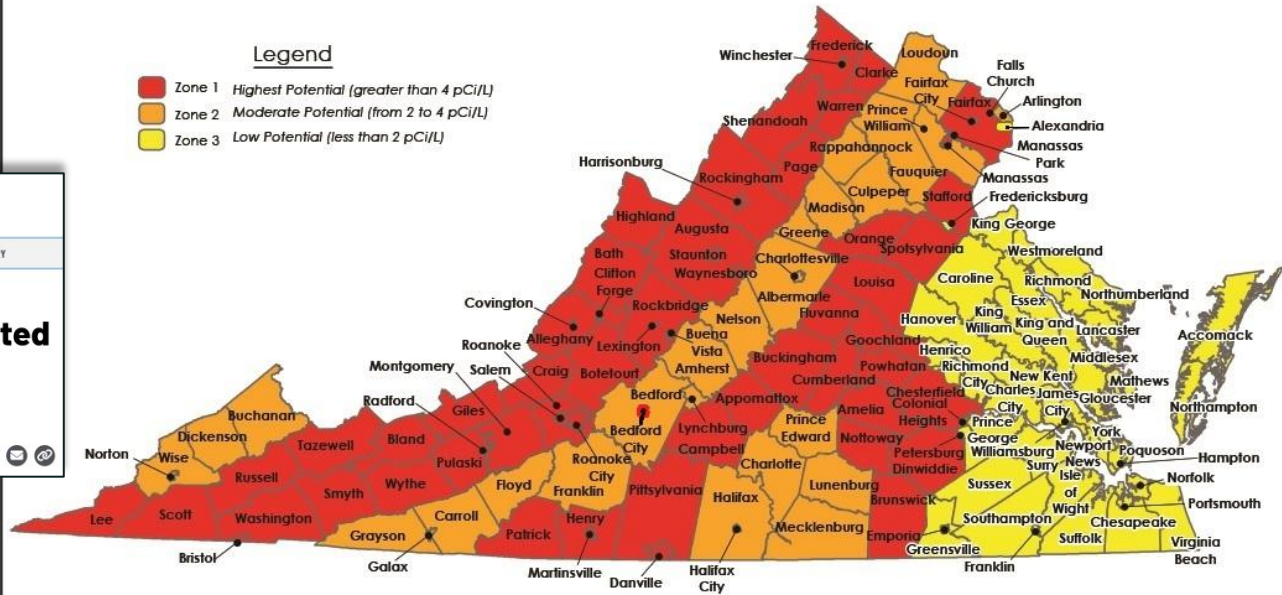
# Radon Recommendations/Benchmarks

- **The only way to know your indoor radon level is to TEST!** It is impossible to predict because there are too many factors that can influence the results.
- Average US indoor radon levels ~ **1.3 pCi/L**. Average US outdoor radon levels ~ **0.4 pCi/L**.
- HUD recommends mitigation if the radon level is 4.0 pCi/L or higher – 4 or MORE!
- It is not possible to reduce indoor radon levels to zero. No level of radon is absolutely “safe”.
- Short term radon testing must occur under “closed house conditions” under conditions suitable for occupancy (ex. HVAC system running normally, windows closed)

# Virginia - Radon Zones

## Legend

- Zone 1 Highest Potential (greater than 4 pCi/L)
- Zone 2 Moderate Potential (from 2 to 4 pCi/L)
- Zone 3 Low Potential (less than 2 pCi/L)



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ENERGY + ENVIRONMENT HEALTH

## William and Mary researchers find elevated radon levels in Williamsburg homes

Health officials say testing is the only reliable way to determine residential radon risk

BY SARAH VOGELSONG - APRIL 27, 2022 12:03 AM



# DHCD's Radon Testing and Mitigation Process

- Procure a Radon Measurement Specialist to test radon in the home after rehab is complete (new windows, insulation, other weatherization)
  
- ❑ PLEASE NOTE
  - Radon testing is not part of the rehab Work Write Up
  - It is not done by the contractors, but by radon professionals.
  
- Obtain the test results and recommendations

# DHCD's Radon Testing and Mitigation Process

- If test has a radon value of **4 or more pCi/L**, procure Radon Mitigation Specialist from a different company
- A second test should be conducted after mitigation by the original company that tested
- If the post mitigation radon test value is <4 pCi/L, add documentation to file. Radon compliance is complete for the structure.

# How is radon tested?

The Virginia Code requires that all professional radon testers and radon mitigators operating in the Commonwealth be currently certified by either the **National Radon Safety Board (NRSB)** or the **National Radon Proficiency Program (NRPP)**. The lists of currently certified radon professionals found on these websites may be searched by zip code to find those professionals who are located closest to you.

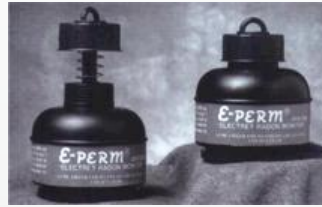


# Radon Test Devices

Continuous Radon Monitors →



Electret Ion Chambers →



Continuous Digital Radon Monitor ←

Long-term Alpha Track Detectors →



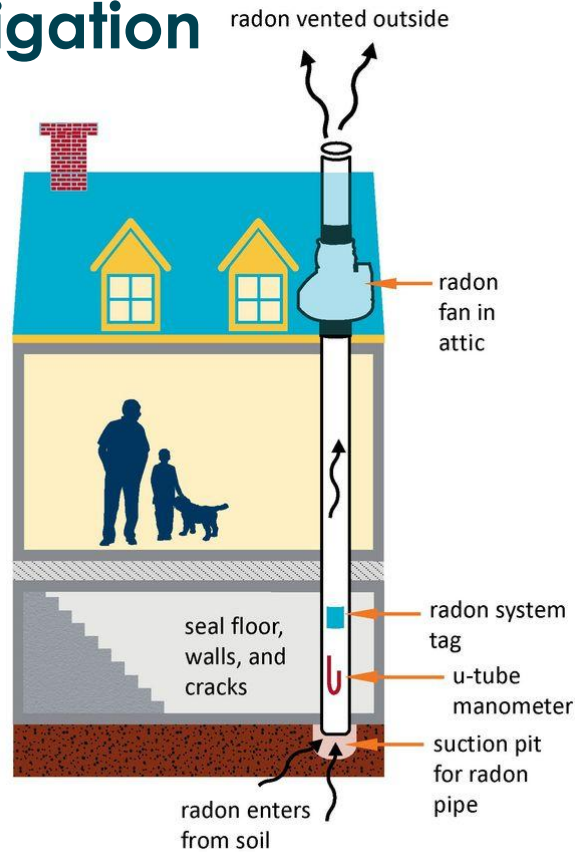
Activated Charcoal Test Kits →



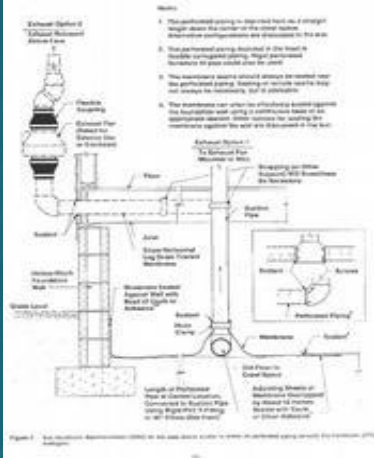
# Radon Mitigation



# Radon Mitigation



# Radon Mitigation in Crawl Spaces



# Radon Mitigation

- A Radon mitigation system is usually a vent pipe system powered by an electric fan (15-120 watts)
- Seal foundation cracks or openings to make it more effective.
- Cost: usually \$2,000-\$2,500. Multiple pipes will add to cost. Usually one penetration pipe will handle approx. 1200-2000 square feet.
- Some older homes built directly on rock or hard soil can be more difficult to mitigate
- After the mitigation system is up and running for a minimum of 24 hours the house should be RETESTED.

# Radon Resistant New Construction (RRNC) Diagram

Properly installed RRNC is thought to reduce indoor radon levels by approx. 50%!

## Gas Permeable Layer

This layer is placed beneath the slab or flooring system to allow the soil gas to move freely underneath the house. In many cases, the material used is a 4-inch layer of clean gravel.

## Plastic Sheeting

Plastic sheeting is placed on top of the gas permeable layer and under the slab to help prevent the soil gas from entering the home. In crawlspaces, the sheeting is placed over the crawlspace floor.

## Sealing and Caulking

All openings in the concrete foundation floor are sealed to reduce soil gas entry into the home.

## Vent Pipe

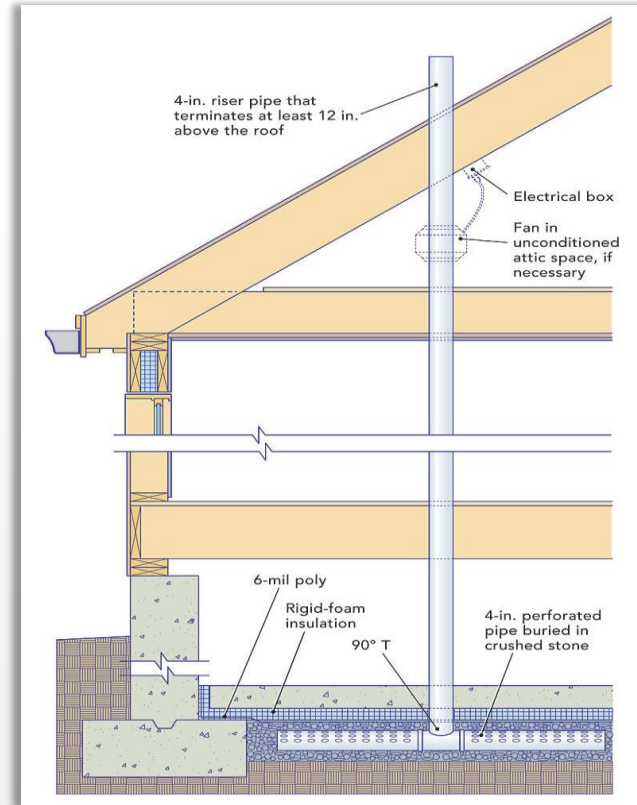
A 3- or 4-inch gas-tight or PVC pipe (commonly used for plumbing) runs from the gas permeable layer through the house to the roof to safely vent radon and other soil gases above the house. If located inside a wall, it should be an interior wall – not exterior.

## Junction Box

An electrical junction box is installed in case an electric venting fan is needed later.

## Testing

Once home is suitable for occupancy, the home should be tested. If  $> 4$  pCi/L, a certified radon mitigator should activate the passive system by installing a fan. Let fan run for minimum of 24 hrs., then retest.



# Required Documentation

- In the Environmental Review Record, include Radon in the hazardous elements list on the Statutory Checklist under the "**Contamination and Toxic Substances**" section.
- List how it will be mitigated under the "**Mitigation Measures and Conditions for Project Approval**"
  - *Example: "Radon evaluation will include a condition for post-construction radon testing followed by mitigation if there is a test value of 4 pCi/L or more. The environmental preparer must update the environmental review record with the radon evaluation and proof of any required mitigation when complete."*

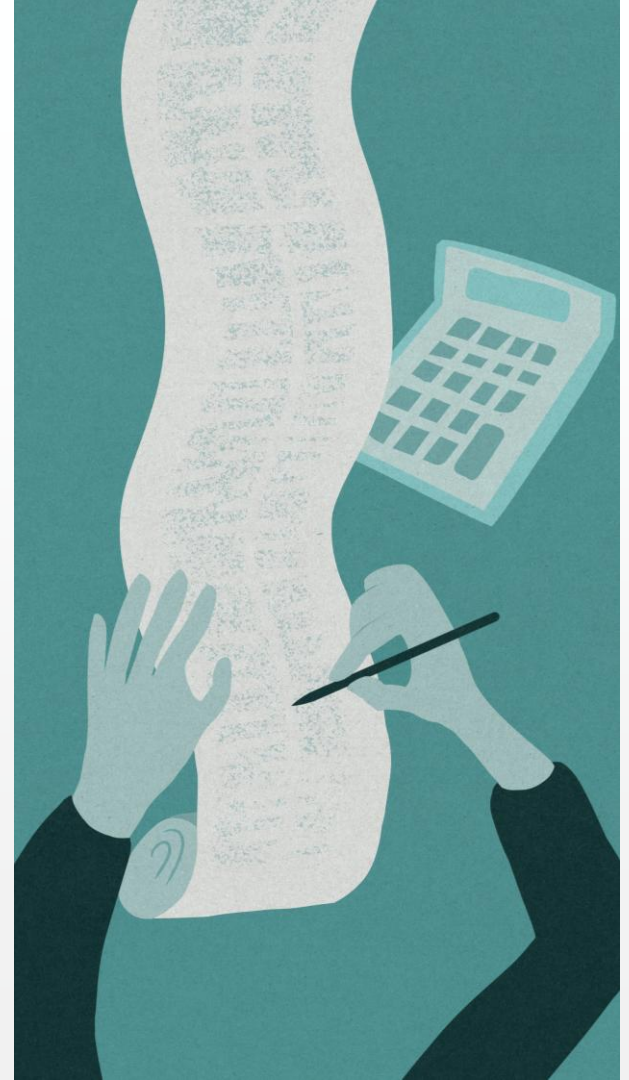
# Required Documentation

Add all documentation to the rehab unit's file – new section of the **“Housing Rehab File Checklist”**

18. Radon Inspection	
a. Testing Company: _____	_____
b. Radon Measurement Specialist Certification	_____
c. Date range of radon testing service _____ to _____	_____
d. Radon Measurement Report	_____
i. Test Reading _____ pCi/L	_____
ii. Cost of Testing _____	_____
e. Mitigation Required? Y/N	_____
i. Mitigation Company: _____	_____
ii. Radon Mitigation Specialist Certification	_____
iii. Cost of Mitigation _____	_____
iv. Documentation of Mitigation Report/Proposal	_____
v. Post-Mitigation Radon Measurement Report	_____
1. Post-Mitigation Test Reading _____ pCi/L	_____

# How to budget for your projects?

- Most projects have waiting until the end of the project to test all the rehabs at one time
  - Make sure client understands that this is at the end of the rehab or project
- Radon testing cost: \$250 - \$450
- Radon mitigation cost: usually \$2,000-\$2,500 (Virginia Dept. of Health)
- Your experience?
- What have you paid for testing?
- Has anyone had to do mitigation?



# Thank you!



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## Contact Us

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