

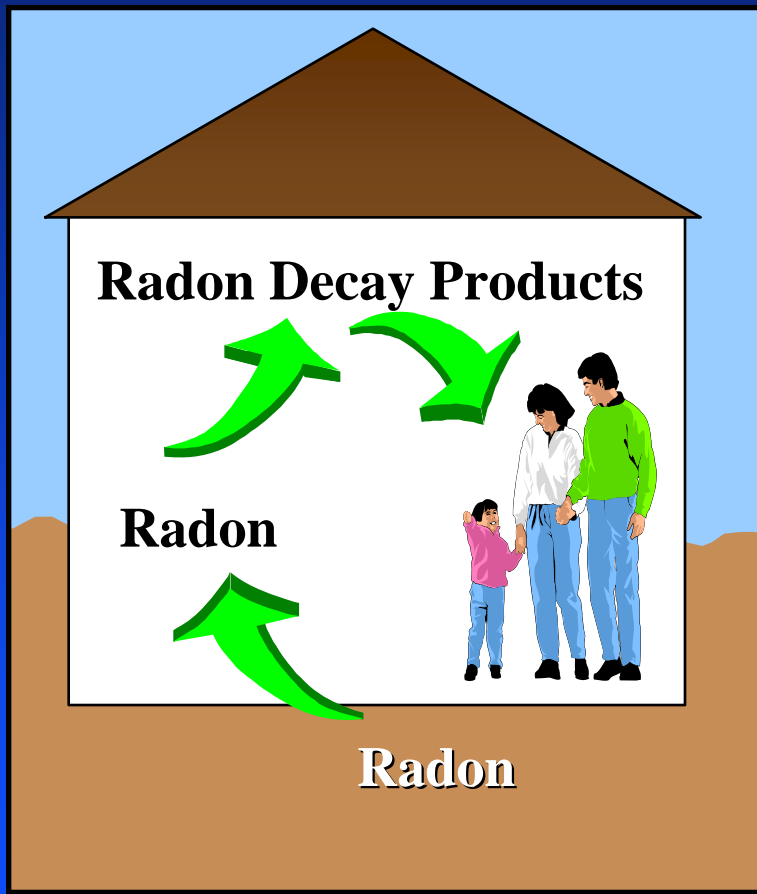
Radon-Resistant
Construction
For New Homes

What Is Radon?



- Radon is a gas
- It is naturally occurring.
- It is inert and cannot be seen or smelled.
- It enters buildings from the soil beneath them.

Why Is Radon a Concern?



- Radon decays into radioactive particles known as radon decay products.
- These particles are easily inhaled and deposited in the lungs where they can damage sensitive lung tissue.

Alpha Particles Are Strong Enough To Pit Plastic

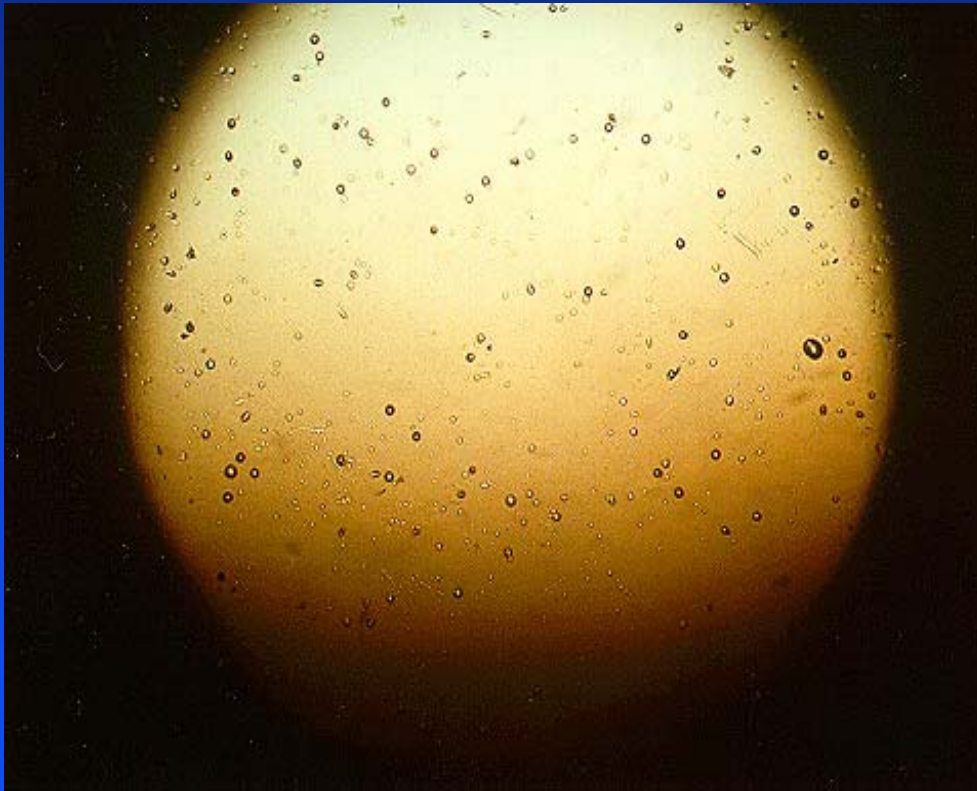


Photo by Dr. J.F. Burkhart

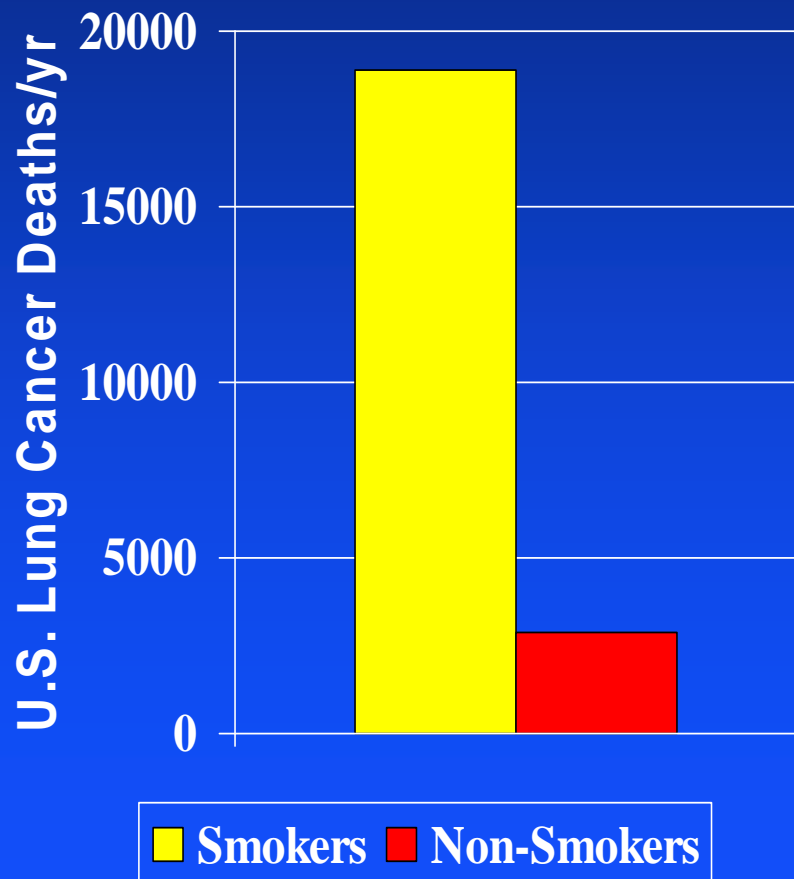
- Plastic chip from passive radon test (alpha track).
- Magnified only 100 times.
- 3 months at EPA Action Level of 4 pCi/L.

Radon Induced Lung Cancer

- Risk increased by both duration & concentration of exposure
- One dart at a time for a long time, or handfuls of darts over a short time

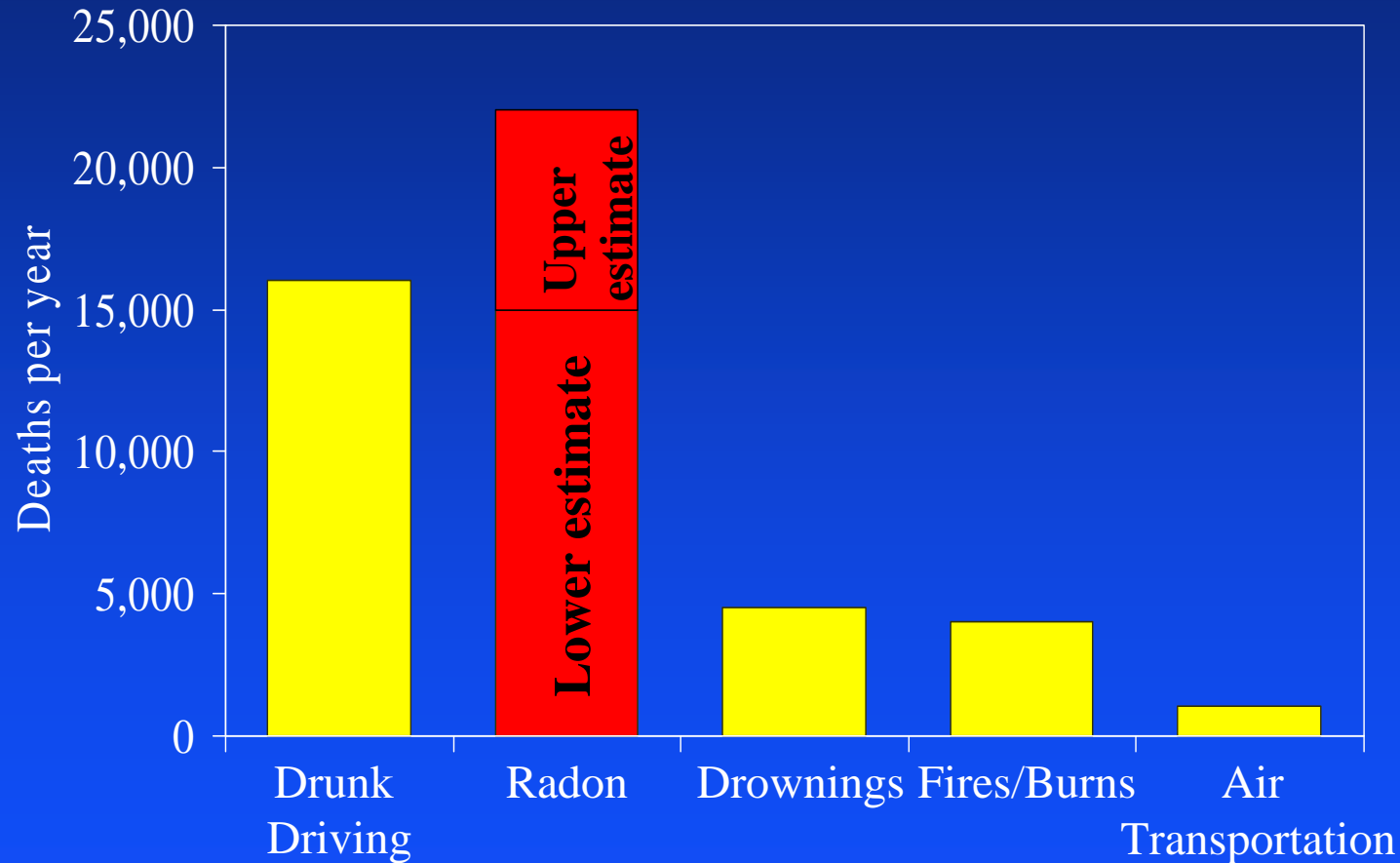


National Research Council BEIR VI: February 19, 1998



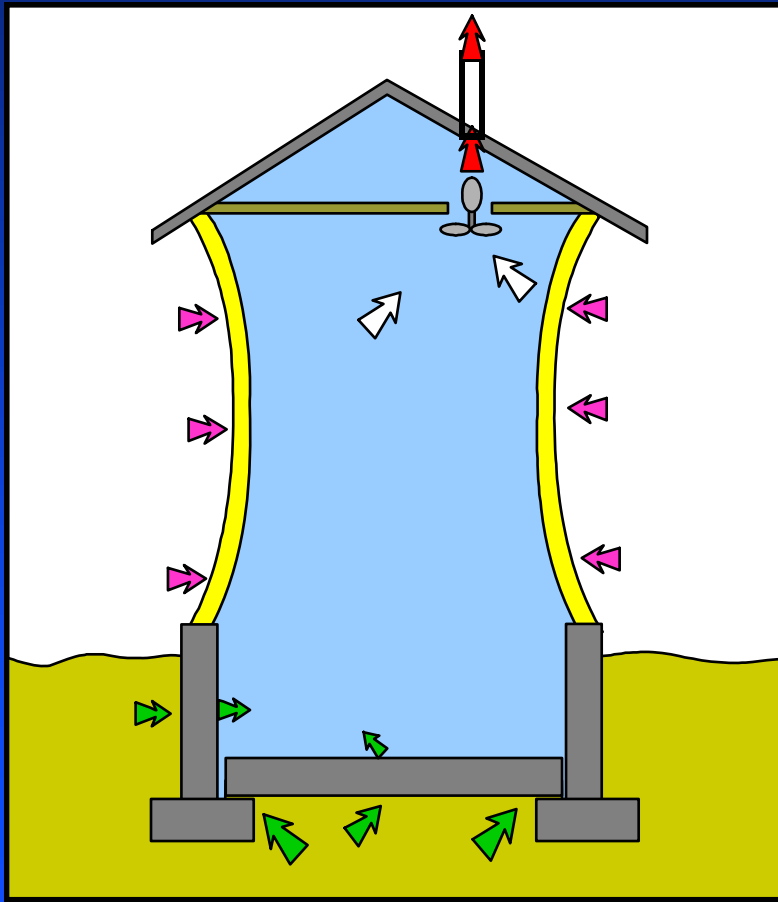
- “Radon is one of the most extensively investigated human carcinogens.”
- Radon is a “...public-health problem and makes indoor radon the second leading cause of lung cancer after cigarette smoking.”
- “...indoor radon should be considered as a cause of lung cancer in the general population that is amenable to reduction.”

How Radon Compares To Other Causes Of Death



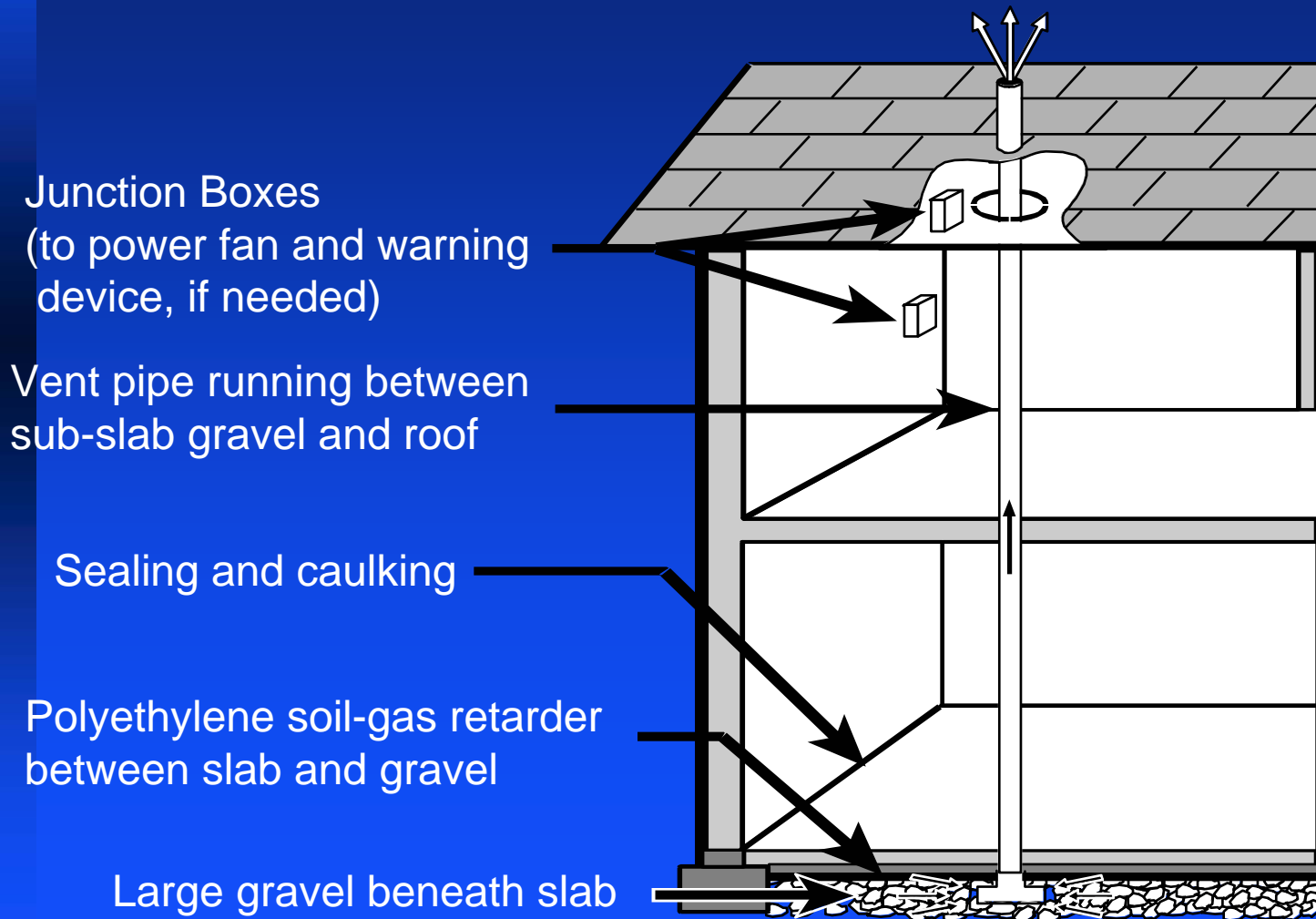
Source: U.S. EPA's Home Buyer's and Seller's Guide (Radon: National Academy of Sciences, Non-radon: National Safety Council)

How Is Radon Drawn Into A Building?

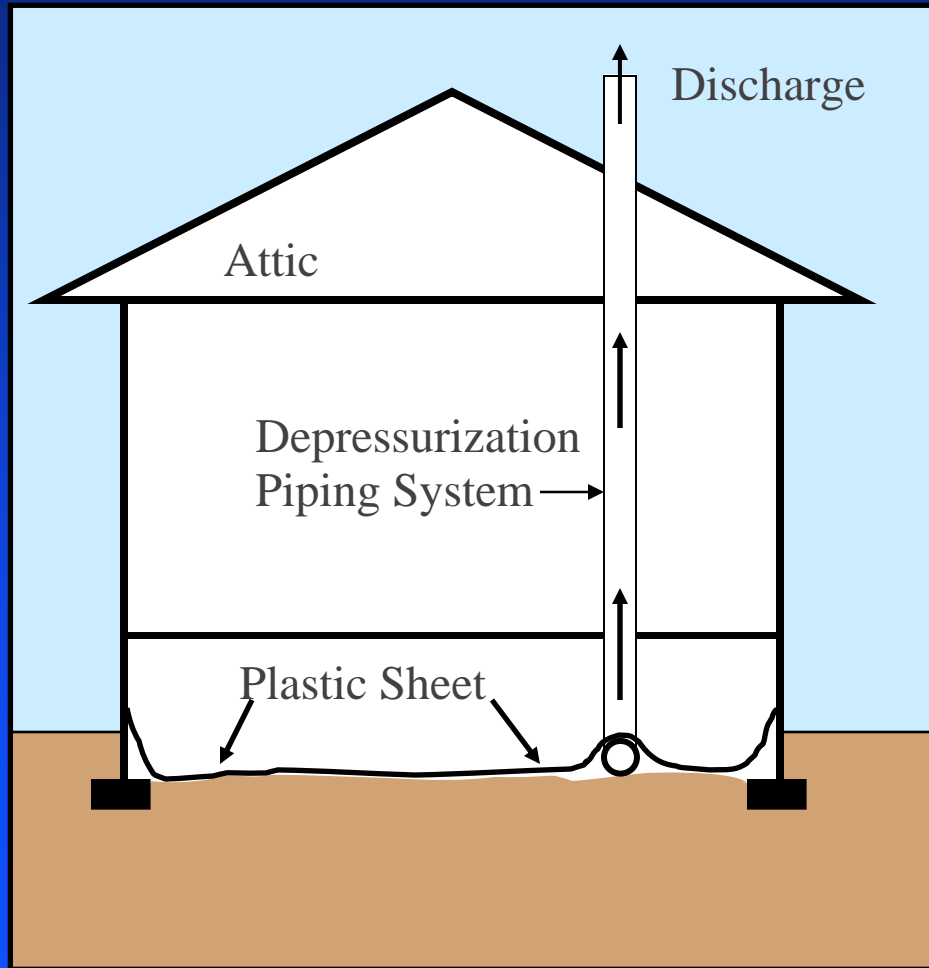


- Vacuums created by:
 - ◆ Exhaust systems
 - ◆ Thermal stack effects

Basic Components of Passive System



Passive System Concept for Crawl Spaces



- Suction point is under plastic sheet placed over exposed soil or rock
- Radon is collected and exhausted outdoors
- Seams and edges are sealed

Why Not Wait Until Home Is Finished?

- You can incorporate features that can eliminate need for fan.
 - ◆ Sub-grade can be made more permeable during construction.
 - ◆ Routing pipe through warm chases can create natural stack effect.
- Vent can be hidden in chases to improve looks.

City Response to Radon

- INFORMATION: Encourage radon testing, mitigation
- INCENTIVE: Test kit sales
- ORDINANCES:
 - ◆ Radon information at point of sale
 - ◆ Building Code rules and inspector certification for voluntary RRNC

Next Step: Require RRNC?

- Air Quality Action Plan: consider RRNC ordinance
- City Council: bring RRNC ordinance for a vote as part of Building Code update

Process timeline

- Public outreach: February-March
- City Council Study Session: May 13
- Building Code adoption: July

Option 1: No Change, Baseline

- Some builders install RRNC voluntarily.
- Some owners fix radon after they move in.
- Assuming no mitigation, expect about 472 cancers during the lifetimes of 59,000 new residents in 24,000 new dwellings with median 2.5 pCi/L.

Option 2: Require RRNC

- 47% reduction from passive system would avoid about 222 lifetime cancers.
- Cost is about \$522 per system, or about \$56,000 per cancer avoided.
- Further reduction if owner installs fan for about \$200

Other Options

We Have Thought About

- Ordinance “exceptions” based on:
 - ◆ First Owner Preference (quasi-voluntary)
 - ◆ Building Location (map-based)
 - ◆ Building Cost (keep housing affordable)
- These are not desirable because:
 - ◆ Un-equal protection
 - ◆ More costly to administer
 - ◆ Home owner can't tell if he has a radon system based on date of construction

Public Outreach

- Web site: www.fcgov.com/radon
- Phone: Comment Line 416-2942
- Outreach to affected groups
- Letter requesting comments
- Advertising, press releases

Thanks to...

- National Environmental Health Association
- U.S. Environmental Protection Agency

...for presentation materials