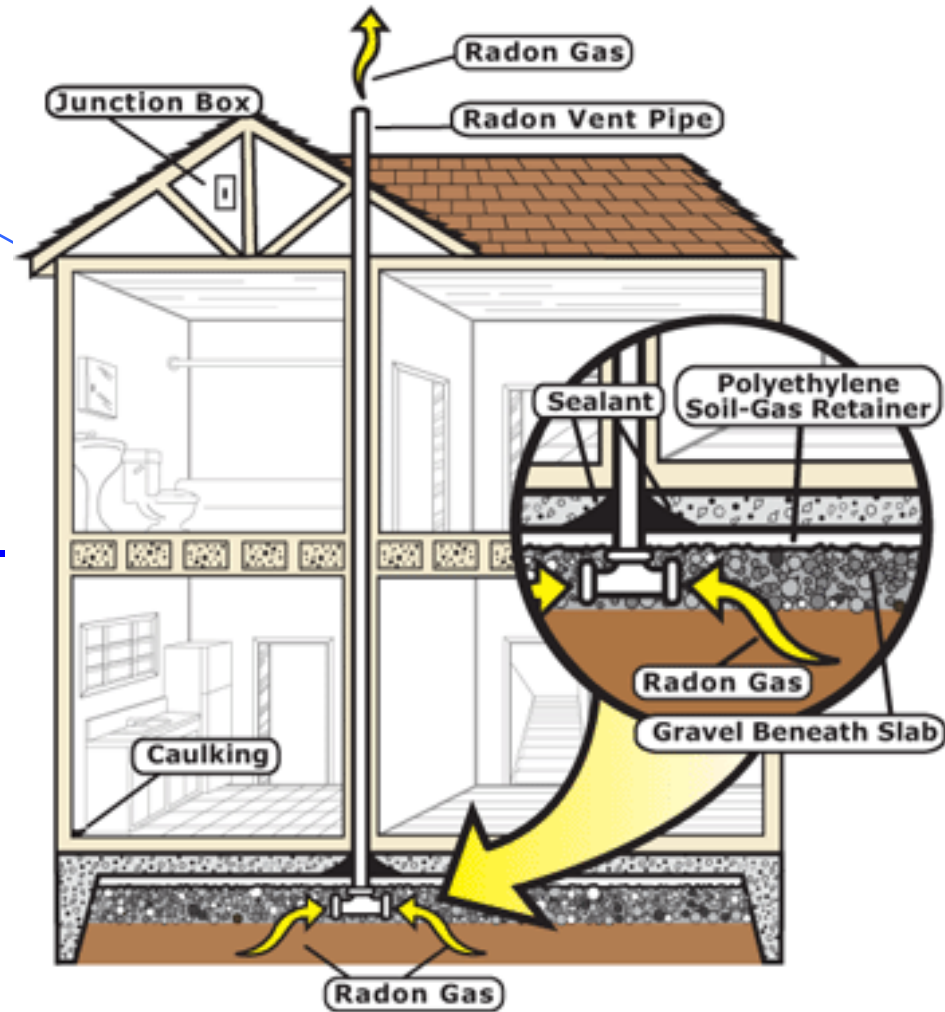


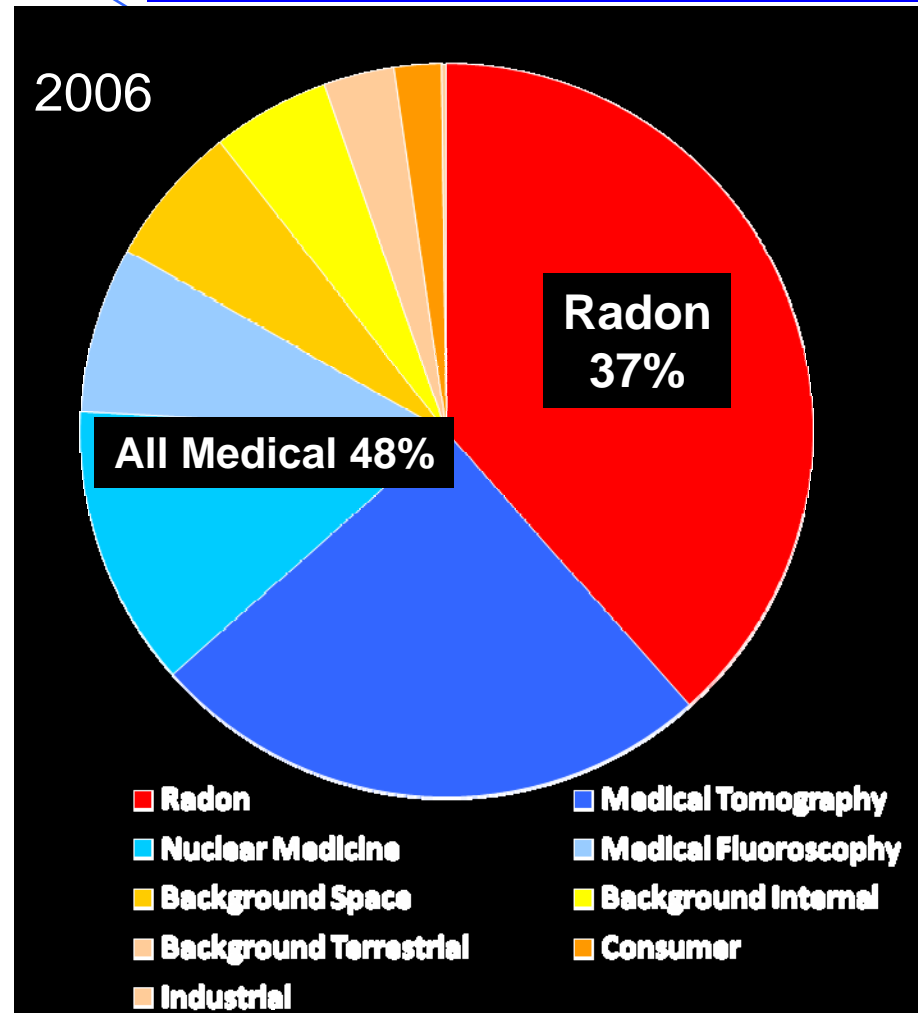
Radon-Resistant New Construction - Basics for Code Officials



Radon Exposure in Homes Is Significant

Average annual radiation source exposures for US citizens

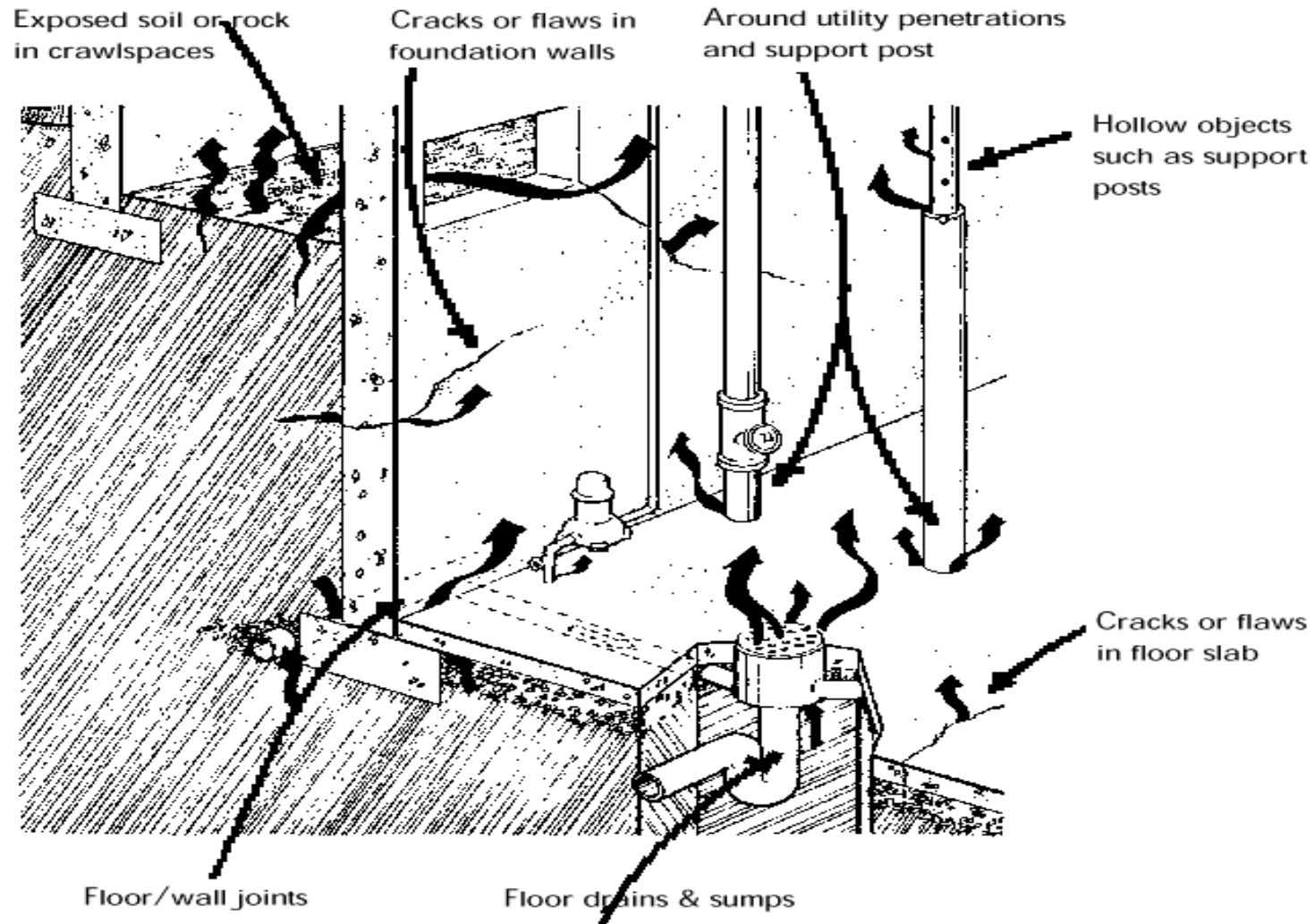
- Radon 222 - Naturally Occurring Radioactive Gas Element
 - Not Detected by Human Senses
 - Indoor concentrations are created by the way we design, build, and operate buildings where we live, learn, and work



Basic Facts

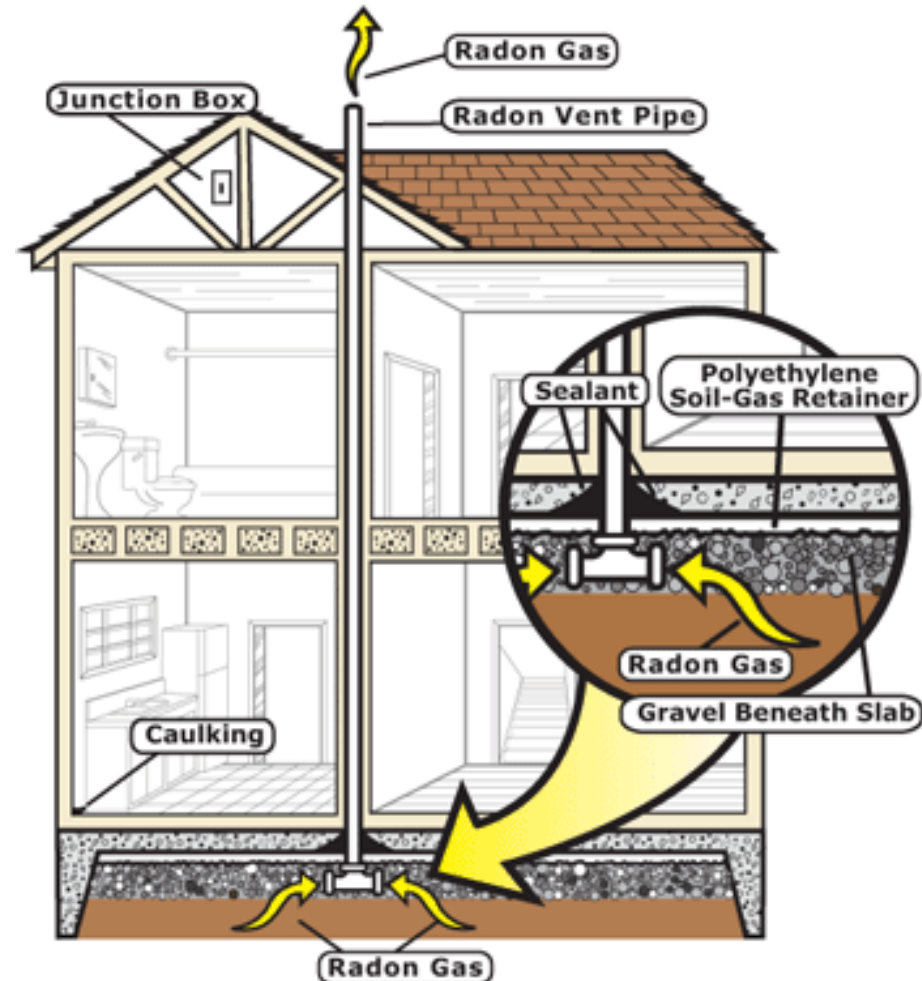
- Radon is Everywhere!
- The only way to know the radon level is to test – it can't be predicted
- Your house may be low, your neighbor's may be high
- 95-99 out of 100 high homes can be fixed with fan powered soil suction systems
- 2nd leading cause of Lung Cancer!

How Radon Enters Your Home



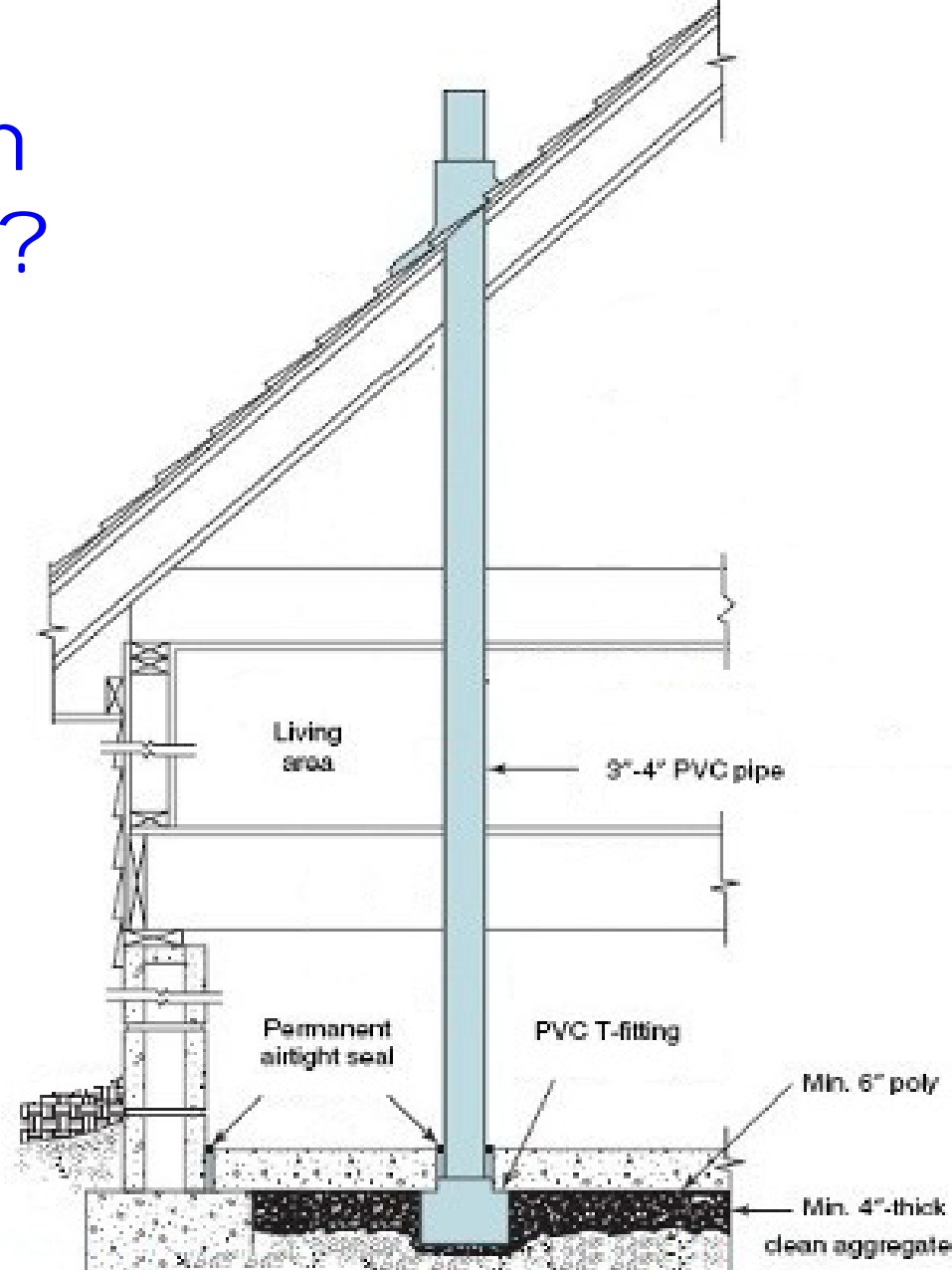
What Does It Take to Build the House Radon Resistant?

- Foundation gas collection system
- Pipe to convey gas through roof
- A closed barrier between soil gas and indoor air
- Provision to add fan if needed



How Is the System Supposed to Work?

- It is designed to vent radon from beneath the structure by use of a vent pipe routed through the conditioned space of a building, connecting the sub-slab area with outdoor air.
- When air in the pipe is more buoyant than outside air, the air escaping the pipe creates a slight vacuum (pressure differential) to pull soil gas towards the outside.
- Known as Passive Soil Depressurization - PSD



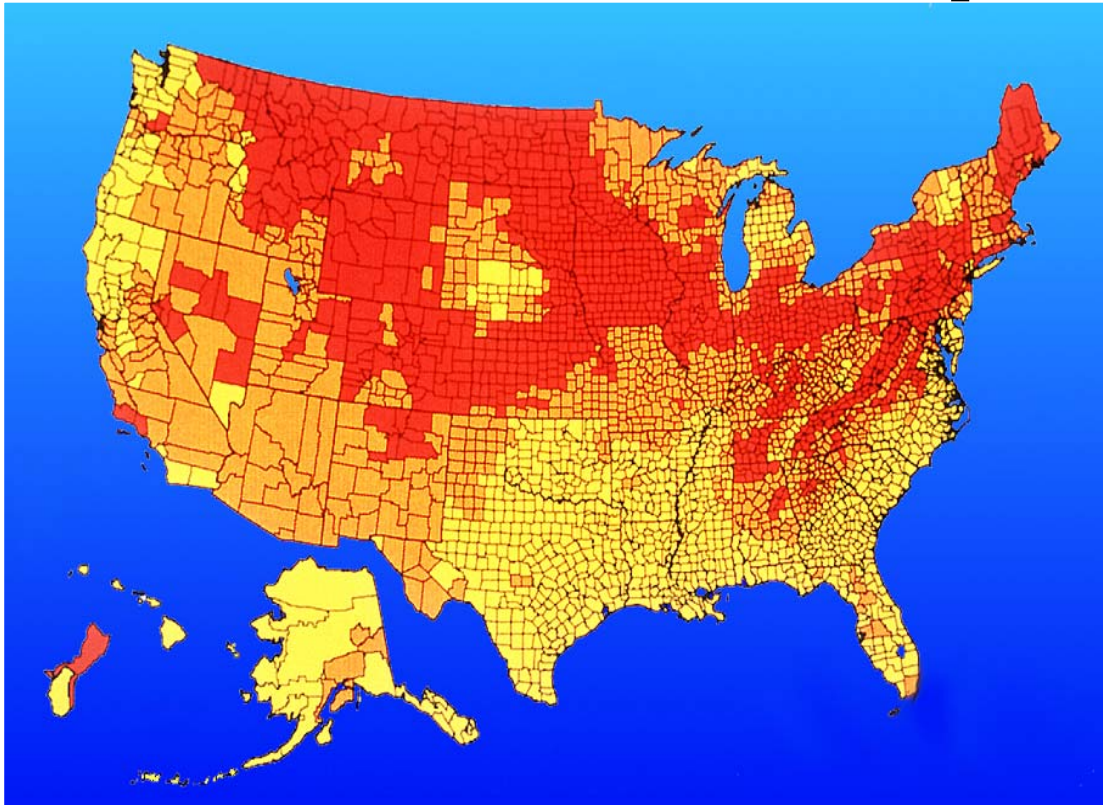
Two Major Reasons Passive Soil Depressurization is Used

1. To reduce indoor radon concentrations
 - In general, about 50% reduction over the course of a year is expected if properly installed
2. To make the house easy to fix if further radon reduction is needed
 - By activation with a fan
 - Stack must easily accessible outside conditioned space for fan installation
 - Power must be available near fan
 - Major openings between soil and occupied space must be sealed

International Residential Code (IRC) Appendix F: RRNC

(Initially intended for Zone 1)

1993 EPA Radon Zone Map



- Adoption is encouraged for all zones as risk has increased since 1993
- EPA Radon Zones
 - Red = High potential
Zone 1 > 4.0 ave.
 - Orange = Medium potential
Zone 2, 2.0 to 4.0 ave.
 - Yellow = Low potential
Zone 3 < 2.0 ave.

IRC Appendix F: Section 103 Requirements (Overview)

1. General
2. Subfloor Preparation
3. Soil-Gas Retarder
4. Entry Routes
5. Passive Submembrane Depressurization (PSD) Systems: Crawlspace
6. PSD Systems: Basements and Crawlspace
7. Vent Pipe Drainage
8. Vent Pipe Access
9. Vent Pipe Identification
10. Combination Foundations
11. Building Depressurization
12. Power Source

PSD Can Work But ... It Needs To Be Done Correctly

- If not done correctly . . .
 - May not provide much, if any, radon reduction
 - Can make future activation, if needed, difficult, impractical, or impossible
- It is *highly important* to test all new homes for radon, even those with PSD
 - PSD does not guarantee < 4 pCi/l but . . .
 - It does reduce indoor radon and it provides a system ready for activation if needed

RRNC Landscape

- State and local codes can require RRNC for homes in high radon-prone areas - but most don't
- IBC needs an RRNC appendix
- IRC needs a better RRNC appendix
- Everyone who touches housing - homeowners, tenants, realtors, builders, code officials, radon professionals - has a self interest in RRNC done right the first time

Resources/ Handout for You

<http://sosradon.org/rrnc>

Radon Resistant New Construction (RRNC)

- Why Consider RRNC?
- Installing Radon-Resistant Features
- RRNC What Do I Give My Builder? - RRNC Codes and Standards
- RRNC Fact Sheets

<https://www.epa.gov/radon/building-codes-radon-resistant-new-construction-rrnc>

<http://www.nehacert.org/CDPHE/ColoRRNCVideo.html>

Building In Radon Control

Radon is a tasteless, colorless and odorless gas

occurring naturally in soil and rock. Radon is a leading cause of lung cancer, second only to cigarette smoking.

Installing a radon system during construction of a structure doesn't cost a lot, and enhances the value of the property.

How a radon system works.

Crushed stone under the house provides an

easy pathway for the radon to migrate towards the vent piping, where it is drawn upwards and released safely into the atmosphere.

The mitigation system will lower radon levels even without a fan, but it may not be enough. A fan may be required. A simple radon test will provide the answer.



A radon test should be performed immediately after the house is occupied, and a fan installed if results are greater than 4 pCi/L.

For further information: IRC 2006 Appendix F, or Pa. Dept. of Environmental Protection, Radon Division, or www.state.pa.us PA Keyword: radon or 1-800-23RADON

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