

# Radon Gas in Yukon

2018 CARST Radon Conference  
Ottawa, Ontario

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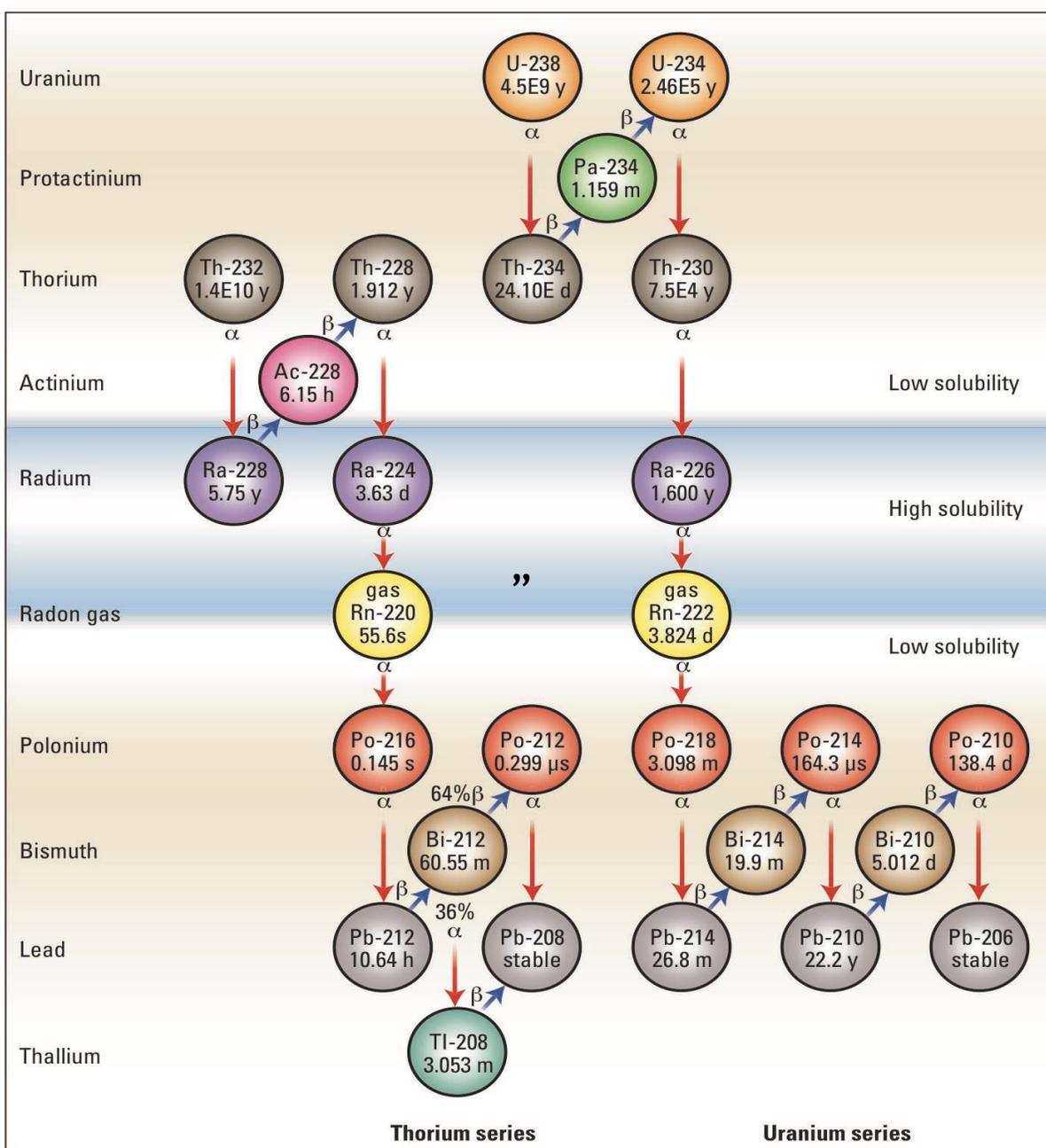
# Topics

1. Influences of our Northern Climate
2. Radon gas Distribution
3. Pilot project in Yukon
4. Observations during the pilot project
5. Questions
6. References

# Influences of our Northern climate

The impact of indoor radon gas is significant in the Yukon because of:

- Length and temperatures of Northern winters
- ‘Capping’ effect from frozen ground
- Climate change impacts on radon gas
- Limited air circulation and fresh air intake in some buildings



# Decay chains: Uranium and Thorium

Fig. 1:  
Natural uranium and thorium and  
decay chains.

Source:  
“Understanding the Radioactive  
Ingrowth and Decay of Naturally  
Occurring Radioactive Materials in  
the Environment”

# Radon Source - Pathway - Receiver

- ▶ **Source:** Radon gas emanates from certain rock formations. It can also be produced by mining or oil and gas industries.
- ▶ **Pathway:** Radon gas needs to find a pathway through rock formations and soils. A pathway into a building is also essential.
- ▶ **Receivers:** People or animals are receivers. The impact depends on certain variables.

# Radon gas distribution - Source

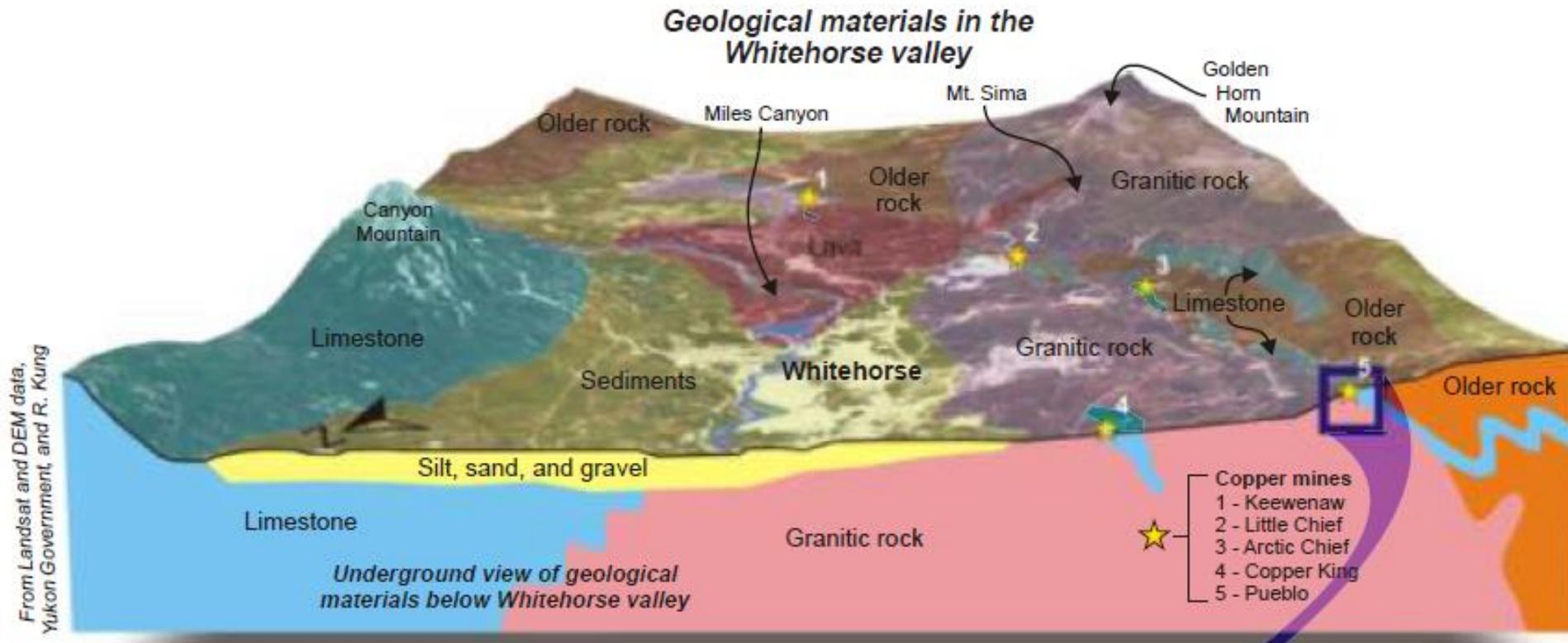
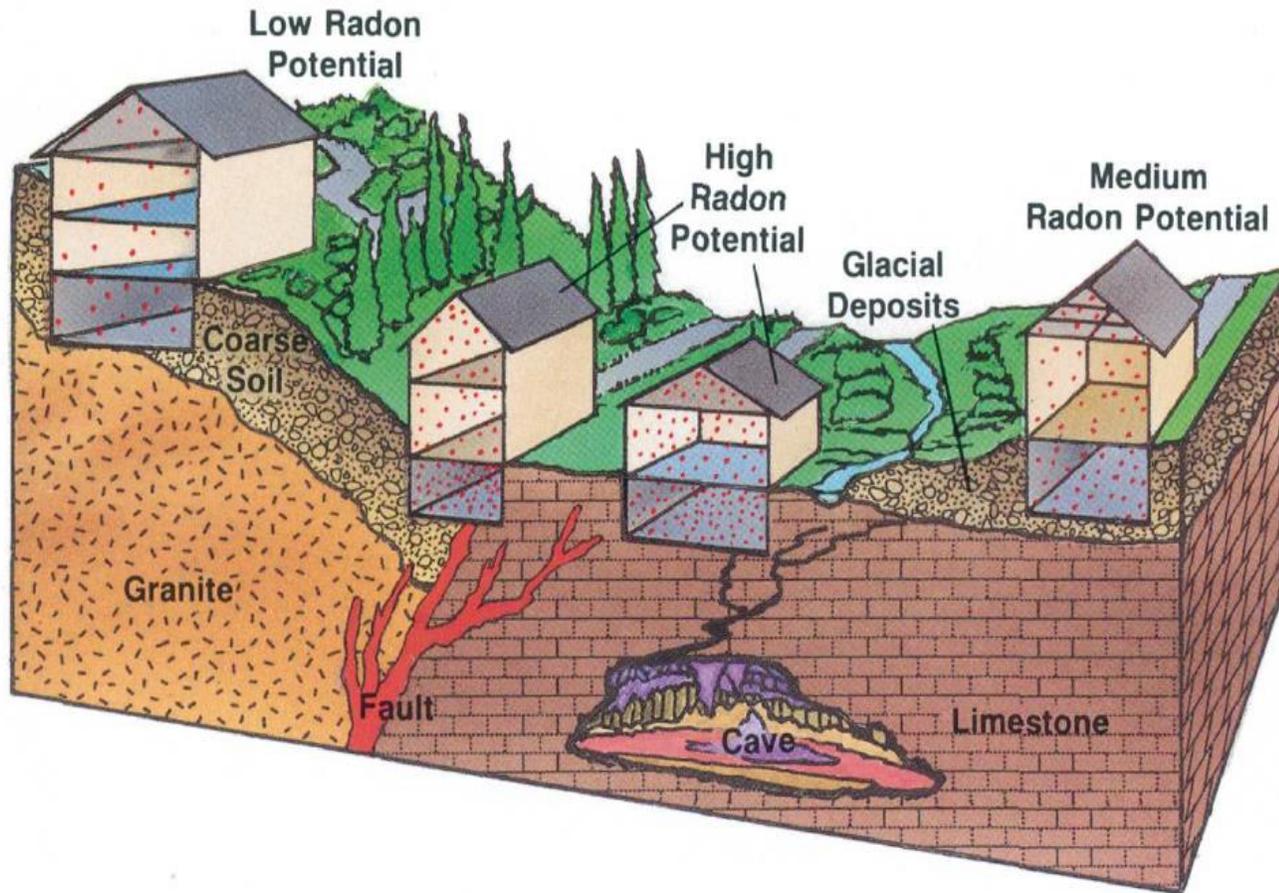


Figure 1: Geology in the Whitehorse area, Yukon Government

# Radon gas distribution - Pathway



Source: The Geology of radon, James K.Otton  
U.S. Department of  
Interior/U.S. Geological  
Survey

Figure 2: Pathways in buildings

# Radon gas distribution – Receivers



"IT'S A BEAUTIFUL HOME WITH THE EXCEPTION OF A LITTLE RADON GAS."

Figure 3: Denial is common.

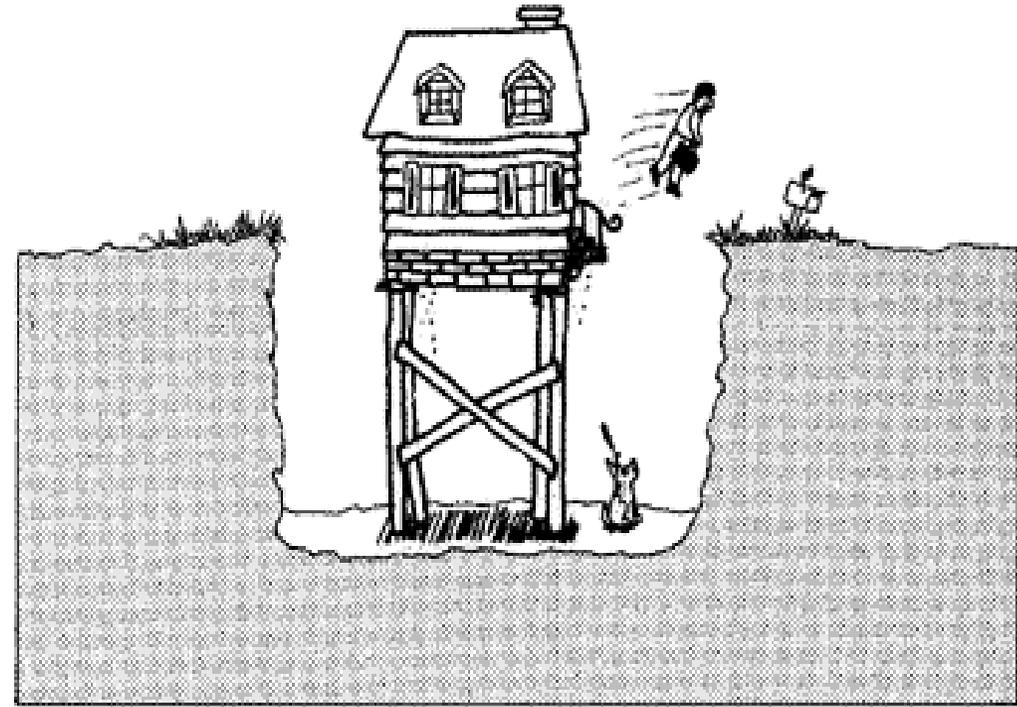


Figure 4: Problem and Mitigation  
Source: Google Images

# Initiatives of the Yukon Lung Association with Yukon Housing, Yukon Health & Health Canada

- ▶ Distribution of free radon detectors in communities outside of Whitehorse (with some Health Canada funding)
- ▶ Distribution of radon test kits for a reduced price of \$25 in Whitehorse (with some Health Canada funding)
- ▶ Participated in Health Canada's three *Take Action on Radon* campaigns with promotion of testing and mitigation.
- ▶ Yukon Housing distributed radon information pamphlets to all Yukon households and health centres

# Moving forward

- ▶ The Yukon Minister of Health, Pauline Frost, stated that “Yukon will make radon testing and mitigation a licensing requirement for daycares and day homes” (CBC News, October 18, 2017).
- ▶ This is in process, with
  - ▶ radon testing in all day cares, and
  - ▶ mitigation
- ▶ To change the licensing requirements is a lengthy process, but there is reason to hope for progress by next year’s conference.

# Pilot project by Yukon Lung Association

- ▶ Some radon testing was done in communities using a portable radon tester
- ▶ Well water testing was done in some areas
- ▶ Some advantages and disadvantages to these grab samples were found

# Observations during pilot project

- ▶ Some laudable examples
- ▶ Mitigation frequently postponed
- ▶ Tenants can't mitigate on their own
- ▶ There is a need for education, policies and enforceable regulations

# Public Education and Incentives Needed

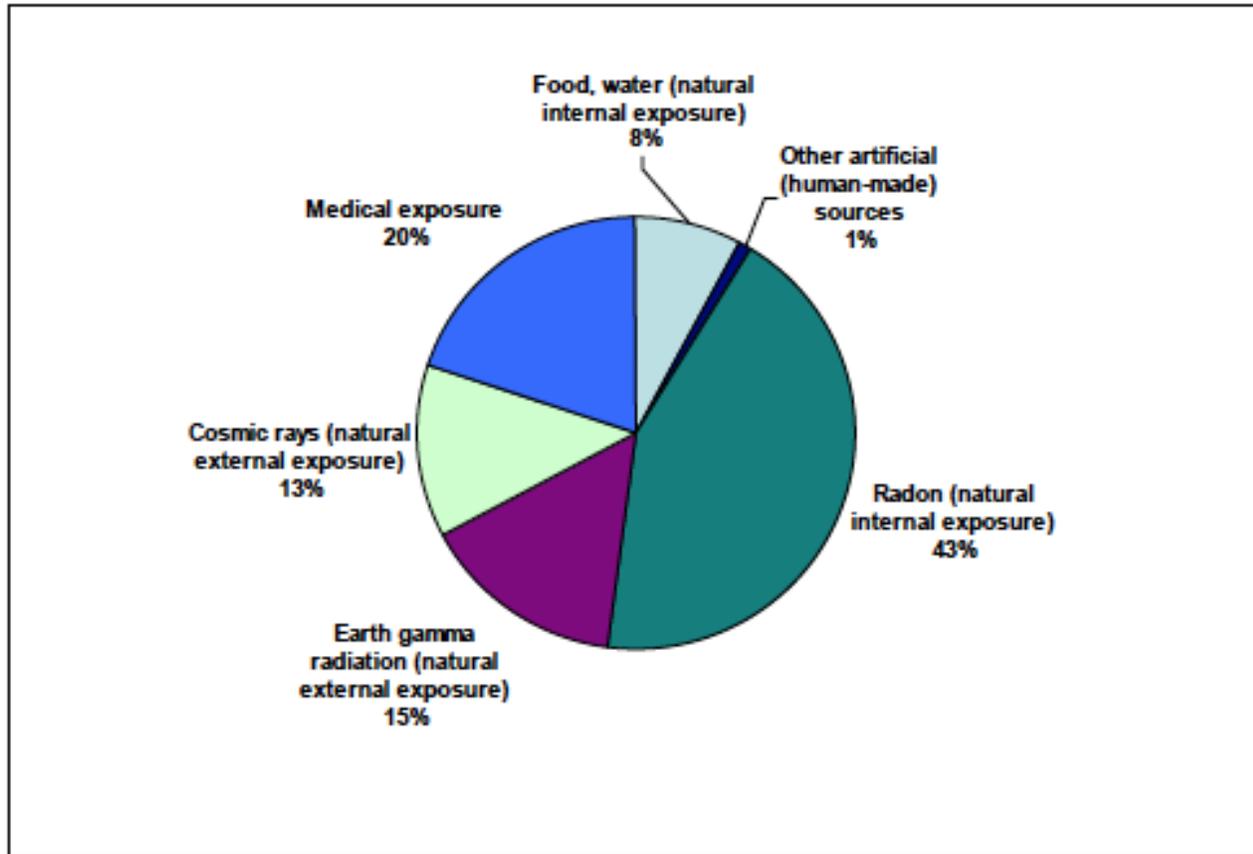


Figure 5:  
Sources and distribution of average radiation exposure for the world population (WHO, 2008).

# Questions

- ▶ When will be the best time to change the radon standard to 100 bq/m<sup>3</sup>?
- ▶ Do correlations exist between high radon concentrations in buildings, soils and ground water?
- ▶ Could radioactive in-growth be a reason for high radon levels in some older buildings or closed well systems?

# References

- ▶ B.V.S. Sachverstaendige-Standpunkt: Radon in Gebaeuden, Germany, 2017
- ▶ Field, R. W. : Climate Change and Indoor Air Quality, EPA Office of Radiation and Indoor Air, University of Iowa, 2010
- ▶ Nelson. A.W. et. al.: Understanding Radioactive Ingrowth and Decay of Naturally Occurring Radioactive Material in the Environment, Environmental Health Perspective, Vol.123. Number 7, July 2015
- ▶ Provincial-territorial Committee on Health and the Environment: Guidelines for Canadian Drinking Water Quality, Ottawa, 2009
- ▶ U.S. Department of the Interior/U.S. Geological Survey: The Geology of Radon