CARST Real Estate Guideline

PROTECTION CANADIANS FROM RADIATION EXPOSURE FROM RADON
Currently short term testing is occurring in Canada
Need to ensure consistent structure and methodology for testing
Provide a framework which supports long-term testing
Introduction

- Fully support long term testing
- Why look at real estate:
  - Increases awareness; initiates the process of testing
    - GOAL: short-term → long-term and mitigation
  - Puts health protection first: know and identify the potential hazard before purchasing
  - Fixing is easy – need to know radon level
  - Budget decisions knowing the age of a roof; furnace; etc. are important and understandable factors in buying a house
  - Budget decisions for radon: knowing radon level is important pre-purchase knowledge
The purpose of CARST REAL ESTATE GUIDELINE

- is to help produce reliable and repeatable radon measurements during real estate transactions to assess the likelihood that dwellings may expose the occupants to annual levels in excess of 200 Bq/m³.
Indicator of 75 Bq/m³

Why:

- Evaluated Research
- Utility of Short-term Basement Screening Radon Measurements to Predict Year-Long Residential Radon Concentrations on Upper Floor, Barros, N. Steck, D, Field, R. W., 29 July 2015

Background of the Study:

- Examine the ability of Basement Winter Short-term measurements to predict the annual radon concentration on upper floors
- Used E-Perm winter measurements of 3-7 days and compared to year-long measurements with RadTrack Alpha Track Detectors

Consideration of 75 Bq/m³ INDICATOR

- 44% predicted a positive test of above 148 Bq/m³ when short-term test was 148 Bq/m³
- But when using a 74 Bq/m³ short term test; predictive value increased to 72%
Indicator of 75 Bq/m³

Additional Discussions with Steck:

(AALA – annual Living Area Average  QALA-Quarter Living Area Average)

- 348 short-term (2 to 4 d) tests in lowest level lived in (10 hours/week) from 56 houses in all four seasons
- Median ALAA = 230 Bq/m³
- FalseN rate = 24% for a 75 Bq m⁻³ yellow light based on AALA of 200 Bq/m³ action level

Follow up Survey:

- 66 short-term (3 d) tests from 66 unmitigated houses in the winter
  - Median ALAA = not measured
  - Median QALA March - July 91 day = 115 Bq/m³
- FalseN rate = 0 % for 75 Bq/m³ (yellow light) based on QALA of 200 Bq/m³ action level
Indicator of 75 Bq/m³

- Winnipeg Radon Testing: Comparison of Test Durations, Effects of House Characteristics, and Efficacy of Floor Drain-Seals, Warkentin and Johnson
  - 5-day; 30-day and 91-day E-Perm
  - Placed simultaneously during winter season (October to March 2009-2010)
  - 50 homes tested in Winnipeg sub-division
  - 33 homes tested above guideline

- 6% false negative at 200 Bq/m³
  - Comparing 200 Bq/m³ 5-day to 91-day above 200 Bq/m³
Possible Suggestion of 50 Bq/m³

Seasonal factors are also known to have an effect, on a short-term measurement. On average a maximum variation of 20% has recorded in Canada when comparing a short term to long-term measurement, although individual variations may be larger. Therefore, the user might consider having more conservative interpretation guidance with an indicator level of 50 Bq/m³, instead of the recommended 75 Bq/m³ when testing is conducted outside of the heating season (Oct-March).
Context for USE of CARST RE Guideline

- For C-NRPP Professionals
- Using C-NRPP listed detectors
  - True Passive Integrating measurement devices and Continuous Radon Monitors
  - Test must be 48 hrs or longer
- Intended for residential dwellings (4-plex and less); in multi-unit dwellings, each unit must be tested
- Placement guidelines based on Health Canada’s Guide for Measurement in Residential Dwellings
  - Additional co-located detectors when using passive devices
  - Test must be placed in occupiable level
  - Additional considerations for: Large Homes; multiple heating/ventilation systems; combination foundations
  - Closed house conditions
    - 4 days or less, closed up for 12 hrs prior;
    - more than 4 days duration of test
- Anti-Interference Measures for Test Process Recommended;
  - additional document for details of possible methods
Interpretation of Results

- **Green Test Results**
  - Below 75 Bq/m³
  - No immediate action; no money in escrow
  - New Homeowner complete long-term test after occupancy

- **Yellow Test Results**
  - 75 Bq/m³ to 400 Bq/m³
  - Initiate funds into escrow for mitigation system
  - Long-term test after occupancy to base decision of mitigation and use of funds

- **Red Test Results**
  - Above 400 Bq/m³
  - Initiate funds into escrow for mitigation system
    - **OPTIONAL**: mitigation sooner dependent on agreement between buyer and seller
    - Long-term test after occupancy to base decision of mitigation and use of funds if not mitigated sooner
Cautions?

- 48 hour test could be lengthened to 4 or 5 day; concerns about real estate process
- Quality Assurance must be conducted by professionals
- C-NRPP professionals must be used:
  - for third-party non-bias actions;
  - ensure proper protocols followed
  - Quality Assurance Program in place
- Need to ensure communication for follow up testing communicated to all homeowners including green results
- $ set in escrow enough to cover mitigation
Recommendations from Dan Steck

- **Things that are wrong with the US real-estate tests using AALS as the gold standard**

  1. Assumed Rn in lowest (lived-in or livable) level, especially if measured in winter, was the worst case.

  2. Allowing extremely short-term measurements (48 hours) that are highly subject to weather conditions.

  3. Insufficient actual measurement data to support the most common tests used: single CRM, dual Charcoal, rapid sequential Charcoal.

  4. Screening test results have poor diagnostic performance in the wide variety of houses and climates since they use double surrogate (different time interval, different location) like a few day-long radon measured in the basement (or other unoccupied location) for a widely diverse country.