

CARST Real Estate Guideline

PROTECTION CANADIANS FROM RADIATION EXPOSURE FROM RADON



Background

- ▶ 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



Purpose

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 3-7days 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

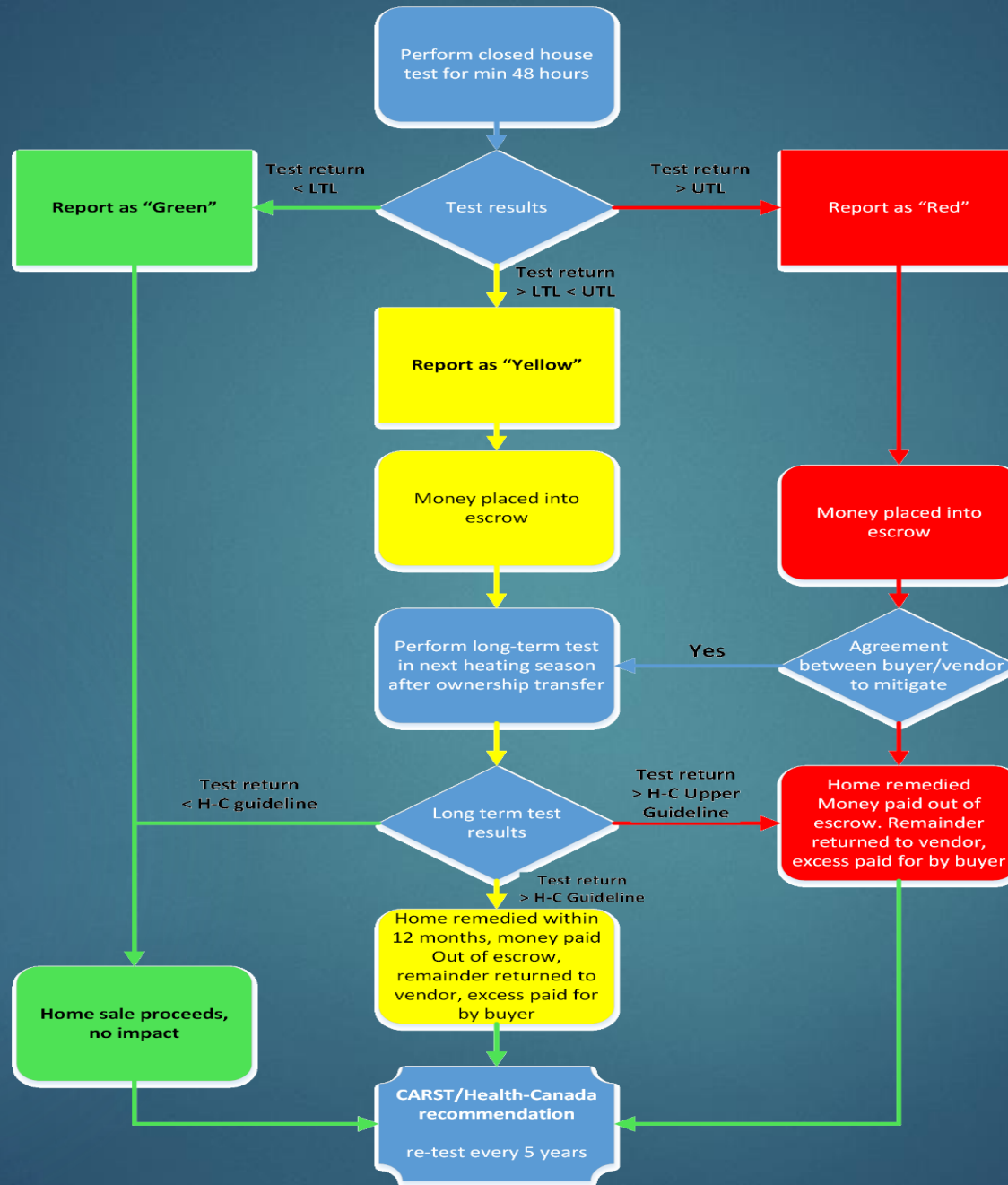
- ▶ For C-NRPP Professionals
- ▶ Using C-NRPP listed detectors
 - ▶ True Passive Integrating measurement devices and Continuous Radon Monitors
 - ▶ Test must be 48 hrs or longer
- ▶ Intended for residential dwellings (4-plex and less); in multi-unit dwellings, each unit must be tested
- ▶ Placement guidelines 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 re
- ▶ \$ 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.

