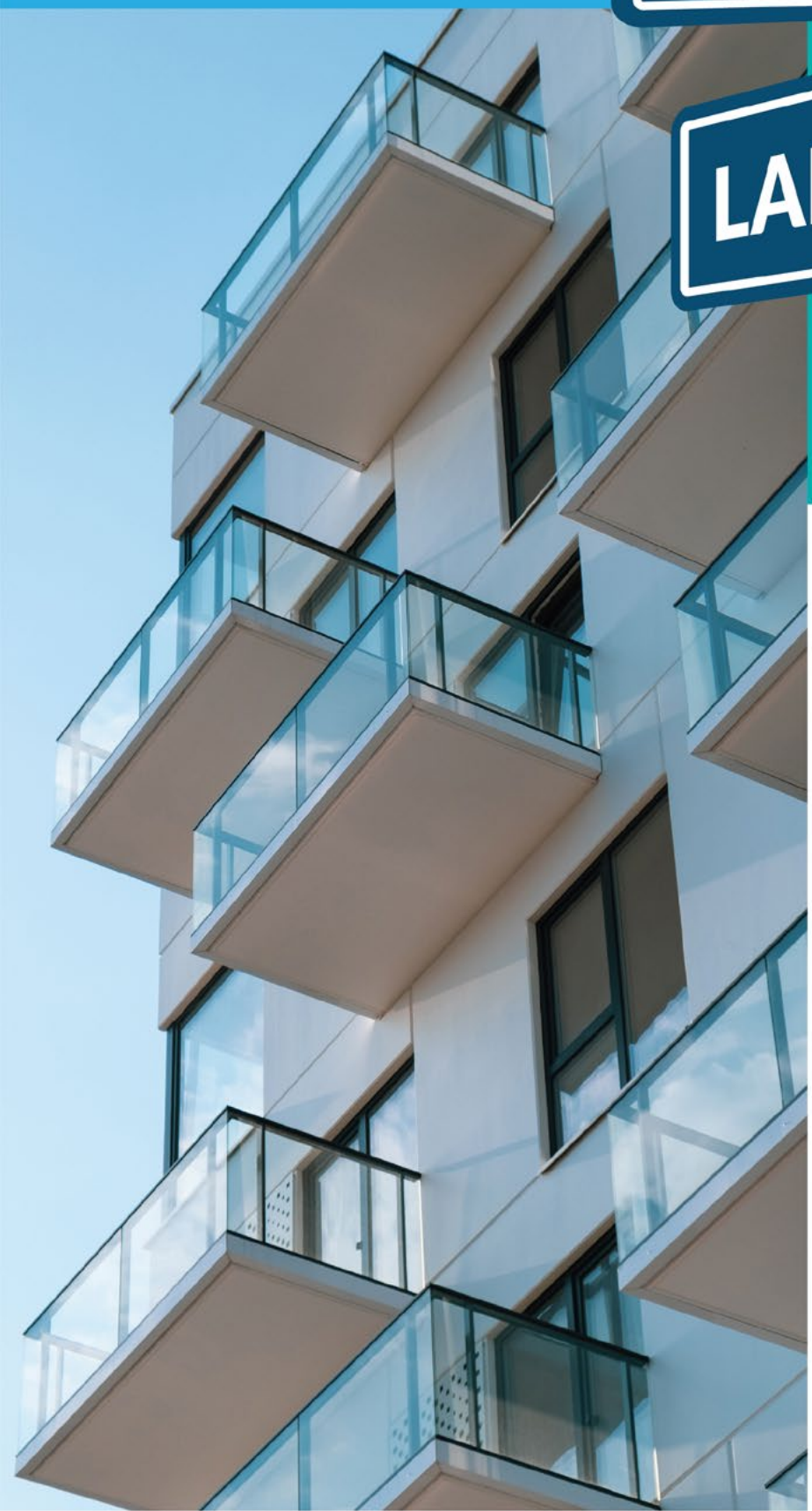
RADON:
a guide for BRITISH COLUMBIA LANDLORDS



LANDLORDBC

BC LUNG FOUNDATION

Summary

Radon gas is an invisible, odourless, radioactive gas that can accumulate in homes and other buildings. When people breath in radon gas, radiation can damage lung cells. Radon is the leading cause of lung cancer after smoking, killing over 3,000 people a year in Canada. However, it is easily tested and fixed. Since 2007 Health Canada has recognized indoor radon as a significant health problem, setting guidelines for indoor concentrations at 200 Bq/m^3.

While radon law and policy has been slow to develop in British Columbia, we think that there are already obligations and rights in law. We describe the steps that landlords can take to test for radon and mitigate if levels are over Canada's Radon Guideline. We suggest ways landlords and renters can work cooperatively to address the issue and provide a checklist for testing to ensure it is done in a way that others will trust. We also consider the special considerations for landlords and renters in strata buildings.

About Our Organization

The BC Lung Foundation's Healthy Indoor Environments is focused on providing education, resources, and policy options for addressing priority indoor air pollutants in British Columbia. Canadians spend 90% of their day indoors, with about 70% at home and 20% at work or school. The air we breathe indoors can contain particulates, gases, allergens and fumes that can significantly impact our health in both the short and long term. Knowing the main indoor air pollutants, their sources, and how to reduce them are key to reducing harm to our health. For more information visit our website at https://bclung.ca/programs-initiatives/healthy-indoor-environments-program.

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Contents

1

Introduction to Radon

Radon is the #1 Cause of Lung Cancer in Non-Smokers

Radon gas is a naturally occurring radioactive gas resulting from the breakdown of uranium in rock and soil. When radon is released from the ground and into outdoor spaces, it is diluted and is not dangerous. However, radon also enters indoor spaces. Radon is invisible, odourless, and tasteless and can seep into homes and other enclosed spaces through any opening where the building contacts the ground (i.e. cracks in the foundation and walls, floor drains, window casements, et cetera).[1] It tends to accumulate on lower floors, which can particularly affect renters in basements. Radon creates ionizing radiation—it naturally decays over time and emits alpha particles. When we breath in radon gas, alpha particles can damage the DNA in lung cells, creating a risk of developing lung cancer. Exposure to some radon should not be a cause for alarm (as might be a fire in your home), but over time the risks can add up.

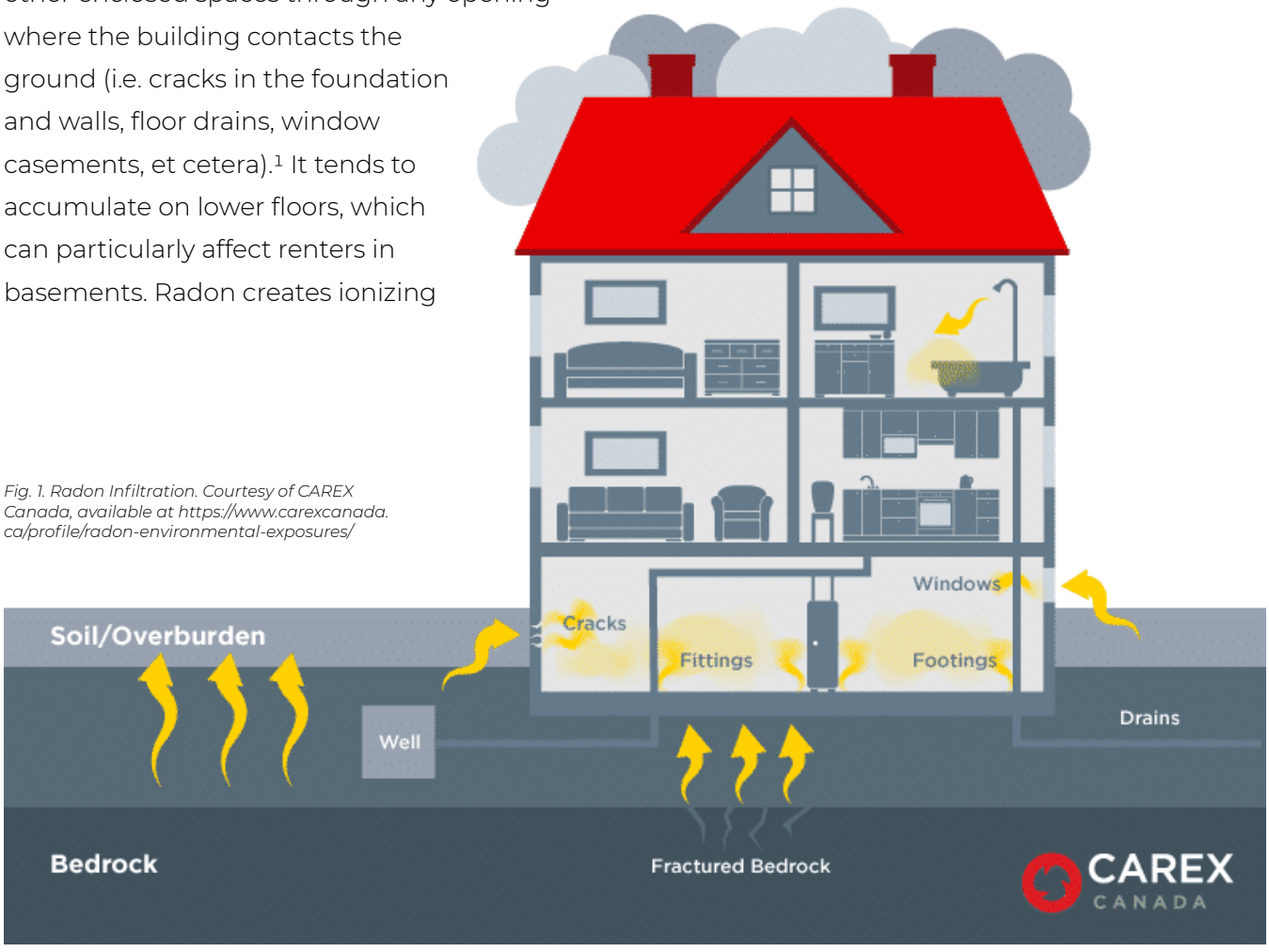
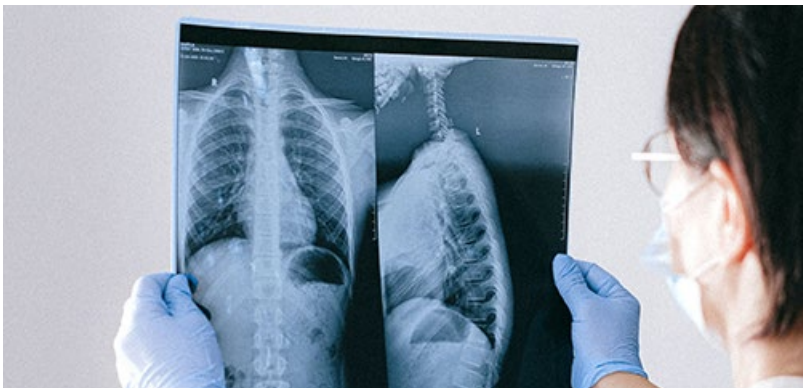


Fig. 1. Radon Infiltration. Courtesy of CAREX Canada, available at https://www.carexcanada.ca/profile/radon-environmental-exposures/

In Canada, radon exposure is the leading cause of lung cancer after smoking, and accounts for an estimated 16% of lung cancer deaths.[2] An estimated 29,800 Canadians contract lung cancer each year. For 2021, it was estimated that approximately 21,000 Canadians would die from lung cancer, accounting for 25% of all cancer deaths for that year[3] Radon causes approximately 3,360 deaths per year, or slightly more than one in 100 deaths in Canada.[4]

Health Canada has set a national radon guideline, representing a level of radon concentration at which health impacts become more significant. Radon is measured in becquerels per metre (Bq/m³). One Bq/m³ means that for every square metre of air, there will be one decay event each second. The national radon guideline is set at 200 Bq/m³ and applies to homes and other regularly occupied spaces.[5] Health Canada recommends that for radon levels between 200 and 600 Bq/m³ mitigation occur within two years, and for levels over 600 Bq/m³ that mitigation occur within one year. Mitigation should be to levels as low as reasonably achievable (which in practice is usually under 100 Bq/m³).

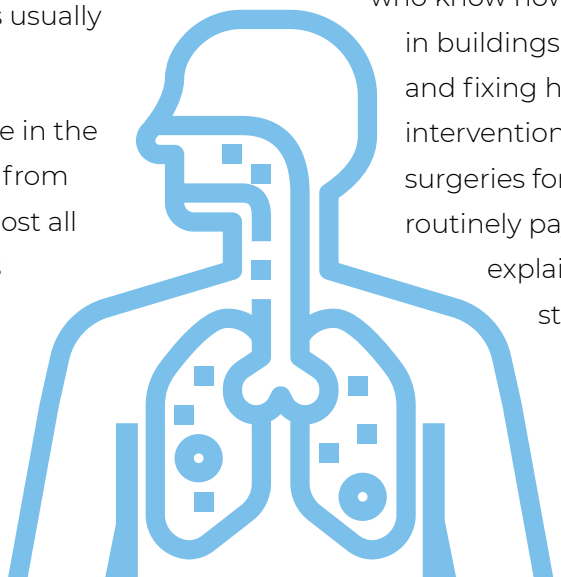
Because uranium is everywhere in the Earth's crust and radon comes from uranium, radon is found in almost all homes in Canada. Most homes have low concentrations that do not pose a significant



health risk. An estimated 7% of homes in Canada have radon levels above 200 Bq/m³.

Under BC's *Residential Tenancy Act* a landlord must provide and maintain residential property in a state of decoration and repair that complies with the health, safety and housing standards required by law, and, having regard to the age, character and location of the rental unit, makes it suitable for occupation by a tenant. This creates an obligation on landlords to test for radon and fix the problem.

Radon exposure can be easily avoided. Radon mitigation is a relatively inexpensive to test and there are now well-trained building professionals who know how to reduce radon levels in buildings. In many cases, testing and fixing homes is a cheaper health intervention than many drugs and surgeries for which our medical system routinely pays.[6] In this Guide, we explain how landlords can take steps to avoid high radon.



Radon Policy in BC is Evolving

Radon is still unknown to many people in Canada. Public awareness remains low, and a vast majority of British Columbian households (94%) have not tested for radon.[7] One of the reasons for this is that law and policy to protect people from elevated radon has been slow to develop in Canada. The federal government has a National Radon Program which has made strides in building awareness and developing guidance materials. However, provinces maintain jurisdiction over key areas under which radon action falls—buildings, public health, and air quality.

In British Columbia different agencies have taken limited steps to address radon. While we think much more should be done, there are signs of increasing momentum:

- The Building Standards Branch has made changes to the BC Building Code. These apply in specific municipalities where testing has found a problem, (see Figure opposite).[8]
- Shared Services BC—the agency that looks after government buildings—has a radon testing program.
- One health authority—Interior Health-- has ordered testing in childcares.[9]

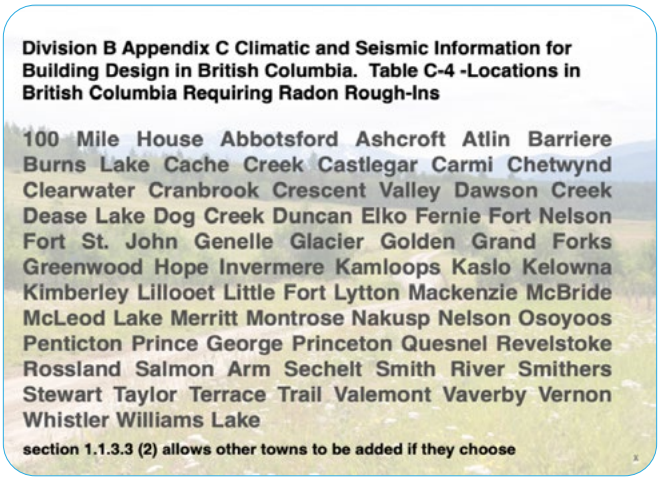


Fig.. 2 Municipalities listed in the BC Building Code as requiring radon rough-ins

- The British Columbia Real Estate Association and British Columbia Financial Services Authority (BCFSA), BC's new real estate services regulator have moved to consider elevated radon levels as a latent defect in a home. This means that someone who sells a home must proactively tell the buyer if they know the home has radon levels over 200 Bq/m^3. This also applies to real estate agents and rental property managers—they must also tell buyers or tenants when they know about elevated radon in a home.[10]

While there are many ways in which the province or the Residential Tenancy Branch could strengthen radon protections, we think even under existing law, landlords have responsibilities and tenants have important legal rights.

2

Steps in Addressing Radon

Know the Radon Level in Your Home

Radon levels vary significantly from home to home. Health Canada's Cross-Country Survey of Radon Concentrations in Homes (2012) found that approximately 7 percent of homes in Canada were over the Guideline. Radon levels depend on a mix of factors, including the underlying geology in the area, the types of soil, how the building is constructed and designed, and even the behaviour of occupants. (Some people are more likely to keep windows and doors open, for instance, and outside air can dilute radon levels). High radon has even been found on the upper floors of high-rise buildings. The only way to be sure that a home does not have elevated radon is to test.

Some geographical regions have many more homes with high radon than others.

The British Columbia Centre for Disease Control has an excellent radon map. Users can search by various health boundaries or by municipality. For each area selected, the map generates a simple infographic explaining radon levels. The map shows some areas of BC having high radon potential, such as the Kootenays, Okanagan and Northern region. Some cities in BC have a very large number of homes that tested at or over 200 Bq/m^3, such as Castlegar (48%), Prince George (30%), and the Kelowna metropolitan area (23%).

Maps are only as good as the information mappers must work with. Over time, maps will improve as more people test. It is important to remember that existing maps may not tell the whole story as many communities lack sufficient radon data or have a very small sample of known radon tests. For instance, Coquitlam, British Columbia has not traditionally been identified as an area with a significant radon problem. However, in 2019 Take Action on Radon—a national radon educational and awareness campaign, sampled 100 homes, and found 2 percent of homes in the city had radon above 200 Bq/m^3.[11] Radon levels can be very different from home to home even within the same community. **The only way to know the radon level in a home is to test.** It doesn't matter if a home is new—it can still have high radon levels. Radon should also be tested after major renovations or energy efficiency upgrades as these can change radon levels.

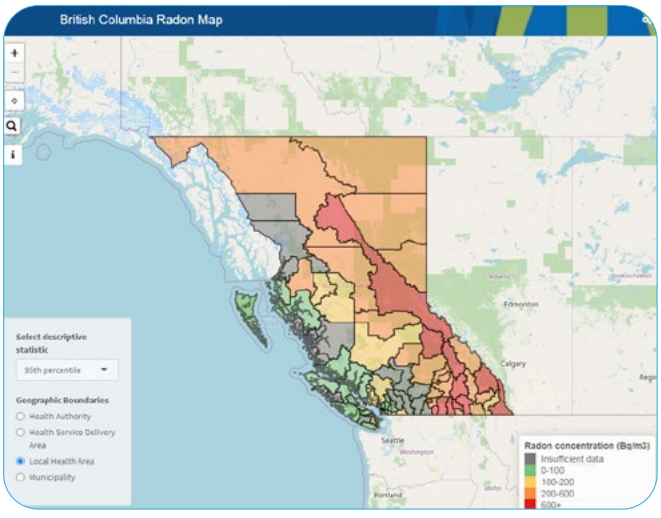


Fig. 3 BC Centre for Disease Control Radon Map.

86 Rn Radon (222) Testing is Easy

In many parts of British Columbia local libraries lend out digital monitors (see figure 4, below). British Columbia Lung Foundation's library lending program provides a list of participating libraries. Digital monitors can help people understand radon levels, because they can quickly see the levels in their home and how they fluctuate over time.

Unfortunately, **radon levels can change significantly from day to day.** There is a significant danger a short-term test will not correspond to the average radon levels over the long term. Health Canada recommends long term tests of at least 3 months. If you take a short-term test and it shows high radon levels, you should follow up with a long-term test. However, low radon levels on a short-term test may be the result of a 'false negative'—a momentary sample in time when radon levels are lower than usual.

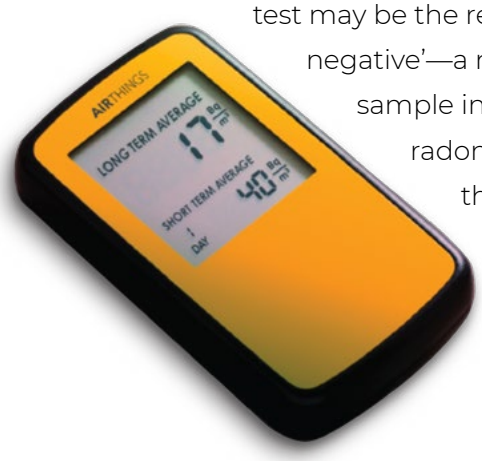


Fig. 4 A digital radon monitor

The most common way to conduct a long- term test is by using a small 'hockey puck' style device known as an 'alpha tracker' (Figure 5). They have a small piece of plastic inside which is dented when hit by alpha particles. They come with clear instructions. The user places them in the lowest floor of the home which is occupied for four hours a day or more. They are available from leading retailers from between $20 and $50 and Take Action on Radon provides a list of providers for British Columbia. The British Columbia Lung Foundation sells them at our website, by email: info@bc.lung.ca. or by phone: 604.731.LUNG (5864).

Fig. 5 An alpha tracker long-term radon testing device

Health Canada has prepared a Guide for Radon Measurements in Residential Dwellings (Homes) and this should be followed by both landlords and renters.

At the end of the document, we provide a checklist that landlords or tenants can use to ensure they are following Health Canada's guidance.

86 Rn Radon (222) Radon is Easy to Fix

Since the 1980s when residential radon was first discovered, building professionals across North America and Europe have developed proven methods for reducing radon levels in new construction and in older homes. There are now many trained radon professionals in Canada. They are certified through the Canadian National Radon Proficiency Program (C-NRPP). C-NRPP provides a list of mitigators on its website that can be searched by location. Professional mitigators can put a system in place in a single day in a house and charge an average of about $2,900, including materials, with some variation by building size and location. These systems will last for a very long time and ensure safe radon levels for all subsequent occupants. Compared to the cost of lung cancer and premature death this is very inexpensive.

In houses, the most common technique is 'active-sub-slab depressurization' (Figure 6). A hole is drilled in the basement foundation (slab) and a vent pipe put in that moves any gases from beneath the slab through and out the house. This technique reduces the air pressure under the slab, ensuring radon is not sucked into the lower parts of the house. In larger buildings, this technique can be used as well. Mitigators may also work with the heating and ventilation system to find ways of increasing air flow and diluting radon gas to safe concentrations.

In 2012 the BC Building Code started requiring 'rough ins'—the bare bones of a radon system—in homes in select areas of the province. The BC Building Code was updated in 2015 to require a full vent pipe, and in 2018 a list was created of specific municipalities. Even if a home has a rough-in it still needs to be tested, and if radon levels are high a fan will need to be added to the radon system.

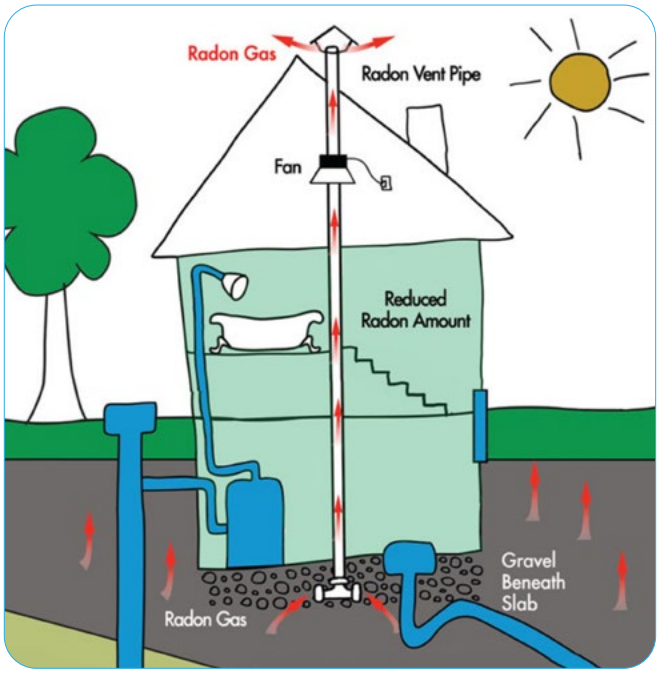


Fig. 6 Sub-slab depressurization in a house monitor

3

Understanding Your Responsibilities

Residential Tenancies

Under Section 32 of the *Residential Tenancy Act* (RTA) landlords have the responsibility to provide a rental unit that complies with all health, safety and housing standards required by law and is suitable for occupation by the tenant. To comply with the RTA, landlords should ensure they test their units at regular intervals and take necessary steps to mitigate radon exposure. The RTA applies to most rental situations, including government owned social housing.[12]

Similar provisions are also found in the Residential Tenancy Regulation, at section 8.

The Canadian radon guideline provides a clear standard, and radon has been considered by landlord-tenant tribunals in Ontario and Quebec where there are similar rules on rental accommodation being suitable for occupation and safe.[13]

As with other issues that may come up during a tenancy, such as the heating systems not functioning, tenants may apply through the RTB's Dispute Resolution process to request an order that the landlord fix the situation[14] and/or an order to reduce the rent to reflect damages.[15] Additionally, if tenants have informed their landlord of the issue and no action has been taken, the RTB can make an order to end the tenancy early.[16] In most cases the RTB will likely order the landlord to fix the issue.

While most issues that arise in a residential tenancy fall under the jurisdiction of the RTA landlords should be aware they may also be liable for damages as allowed under British Columbia's *Occupiers Liability Act*. **Testing and mitigating radon is an excellent way to limit risk of liability.**

Occupational Health and Safety

Landlords should also consider people who work in their buildings such as building managers. The Canadian guideline for radon applies to workplaces that are occupied four hours a day or more. As well, in BC, workers are covered by the *Workers Compensation Act* and the Occupational Health and Safety Regulation OHSR). While WorksafeBC does need to update its policies on radon, the existing BC workplace regulations do cover radon.

There are existing sections of the OHSR that cover 'ionizing radiation'.[17] Workplaces should always strive to keep radiation exposure as low as reasonably achievable, but in most cases a threshold of exposure is provide at 1 millisievert in a year. This will be approximately achieved if radon concentrations are kept under 200 Bq/m.[3]

The OHSR also contains a "general duty clause". Section 2.2 states "Despite the absence of a specific requirement, all work must be carried out without undue risk of injury or occupational disease to any person." These broad measures are sufficient to cover radon. Ontario has adopted the formal policy that the 'general duty clause' includes protection from elevated radon. The guidance is easily accessed through a website titled "Radon in the Workplace"[18] The reasoning behind this guidance should also apply in BC. Employers need to test for radon, given requirements for regular inspections to prevent unsafe working conditions.[19]

Readers who want a more detailed description of the law should consult our publication Radon and Renters: Current BC Law and Potential for Reform.

4

How Landlords Can Help

Radon is still relatively unknown and both landlords and tenants are beginning to learn about it. We have prepared this Guide to help landlords learn about the issue.

There are many reasons why landlords may be willing to act to address the problem.

- Many landlords live in the same building as their tenants and share a concern for human health.
- Once a unit is tested any uncertainty will be removed.
- Landlords do not need to test every time a new renter moves in, but can instead test periodically, once every five years.
- If radon levels are low, this can be a feature which makes a rental unit more desirable.
- If levels are above Canada's Radon Guideline, they can be fixed for current and subsequent tenants at a relatively low cost.
- Once radon systems are in place they last for decades.
- In multi-unit buildings it will be important that many units be tested, and radon levels be addressed for the whole building.
- It is much easier to take care of the issue on a whole-building basis than try to address individual units as complaints arise.
- Finally, landlords generally do want to follow the law and provide safe accommodation.

We think landlords and renters can avoid conflicts by openly talking about radon and what to do about. If landlords and tenants can agree on how to test for radon and to accept the results of radon testing, the process will be much easier. In Appendix 1 we provide a checklist that landlords and tenants can use for radon testing. Ultimately, it is the landlord's responsibility to ensure a rental unit does not have elevated radon levels. Landlords have an obligation to cover the cost of testing.

5

The Role of Rental Property Managers

Many larger rental buildings will have professional managers. Rental property managers are professionally governed as real estate licensees by the *Real Estate Services Act*. BCFSA has guidance and checklists concerning radon for rental property managers.[20]

BCFSA advises rental property managers that radon levels at or over 200 Bq/m³ constitutes a material latent defect, and that this must be disclosed to all potential tenants. BCFSA directs property managers to discuss radon with building owners as well as tenants. Property managers should advise sellers and landlords that radon levels of 200 Bq/m³ or more constitute a material latent defect and must be disclosed to buyers and tenants. They should suggest that homes be tested, particularly if the home is in an identified risk area, and discuss options that a tenant may consider, such as rent reduction or requesting a radon test and remediation. Property managers should request radon tests from their clients (e.g. landlords) and if levels are high are obliged to tell prospective tenants.

6

Special Rules In Strata

Strata properties (condominiums) pose special challenges because fixing radon may involve changes to the structure of the building or common areas, which will require cooperation from the strata council. In some cases, fixing radon will fall be entirely outside the control of the landlord. Renters will still have protections under the *Residential Tenancy Act*, but in strata properties there will also be rules set out in the *Strata Property Act*, the specific bylaws of the strata corporation and the decision-making of the strata council to consider.

In a strata development, individual owners own their units, but they jointly own the common areas outside their lots. These common areas are managed by the strata corporation, whose members are all the owners in the building. As well, most strata corporation bylaws hold that if owners wish to make alterations to the structure and exterior of the building, they will need written approval of the strata corporation, and likely alteration to common areas.[21]

We expect that in the normal case, landlords will find that the strata council will be happy to cooperate. Strata corporations have a general requirement to fix radon that involves common property. This follows from general obligations in the *Strata Property Act* for the corporation to repair and maintain common property and common assets.[22] Members of the strata council have a duty of care to act in the best interests of the strata corporation.[23] As well, the Standard Bylaws hold that the strata corporation must not unreasonably withhold its approval for necessary repairs.[24] Under the standard bylaws, there may also be action against another owner who allows radon to enter their own unit and then flow to other parts of the building. Most strata corporations have bylaws that say an owner or occupant must not use a strata lot in a way that causes a nuisance or hazard to another person.[25]

In approaching strata councils, landlords can share this Guide and our legal opinion on Radon and Renters. Depending on the building, radon may be a problem for most or all occupants, or it may be cheaper, easier, or even necessary for the whole building to be tested and mitigated and the costs shared amongst the members.

If the strata do not cooperate, there are steps that owners can take. *The Strata Property Act* provides that owners can:

- Requesting a hearing at a strata council meeting;[26]
- Organizing a special general meeting (requiring a written demand signed by persons holding at least 20% of the strata corporation's votes;[27]
- Seeking to have the bylaws changed (for which ¾ of votes is required); or[28]
- Using a voluntary dispute resolution process (provided for in the standard bylaws).

The Strata Property Act also sets up a series of more formal steps to handle disputes. A condo owner can initiate a mediation-arbitration process[29] and if this does not work, proceed to the Civil Resolution Tribunal (for small claims up to $5,000).[30] For more expensive and complex matters applications can be made to the Supreme Court.[31] Landlords should remember, however, that the Residential Tenancy Branch can still make a finding to protect renters even when the strata council is not cooperating.

7

Conclusion

Radon gas exposure is a problem across Canada but it is also one we can easily address. We think there is more that the provincial government, municipalities and regional districts can do, and we advocate for strong rules requiring homes and business to be tested for radon. There are many possibilities for reform, and we spell this out more in our companion legal opinion. However, it remains important for people to do what they can now, including ensuring their homes are tested and mitigated. We have written this Guide knowing that the there has not yet been significant action for renters in British Columbia. We expect that over time uncertainties will be removed, as landlords get used to testing and mitigated, and the Residential Tenancy Branch learns more about

radon. We hope this Guide will give landlords and renters the tools they need to ensure homes are free of elevated radon and accelerate the process of clear rules and guidelines developing in British Columbia.

8

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30 *Strata Property Act* s. 189.1

31 *Strata Property Act* ss. 164 and 165

Checklist for Radon Testing

This checklist is designed to help people ensure they have followed correct procedure in testing for radon. By filling in the form, a person can show they have taken care to follow appropriate procedure. This will help landlords and tenants agree as to how testing should be carried out. We encourage all parties to cooperate on friendly terms. In the event of a conflict, this checklist can also serve as evidence correct procedure was followed.

This checklist is based on Health Canada's Guide for Radon Measurements in Residential Dwellings (Homes)(2017).

1 Obtain a C-NRPP Certified Testing Device

Testing devices should be designed to allow for 91-day tests. Ideally, testing should be conducted during the heating season of October to April when radon levels tend to be highest.

If you are testing a multi-unit residential building and plan on deploying 10 detectors or more, Health Canada advises using duplicate measurements to ensure quality control. One duplicate should be deployed for each 10 detectors. Duplicate measurements are made by placing two detectors side-byside (< 10 cm or 4 inches apart). In the case of multi-unit residential buildings, please ensure duplicated are placed evenly across units being tested.

To find testing devices visit https://takeactiononradon.ca/test/radon-test-kits/#local_1

To check whether the device is C-NRPP certified visit https://c-nrpp.ca/approved-radon-measurementdevices/

Company and product name of device

Serial or identification number

Is the device C-NRPP certified? ◯ *Yes* ◯ *No*

State how you know its C-NRPP certified?

Number of test devices deployed including duplicates for quality control

2 Place the Detector in Your Home

CHOICE OF ROOM

Place the radon detector in the normal occupancy area of the lowest lived-in level of the home.

You can test in bedrooms, hallways, living rooms, dining rooms and home offices.

Place the detector in a location where it is unlikely to be disturbed.

Do not test in bathrooms, kitchens, laundry rooms, closets, cupboards, sumps, crawlspaces or nooks within the foundation. These are locations in radon concentrations are likely to be different from other living spaces, or where people do not typically spend at least 4 hours a day.

For basements, only test if:

A. the basement has finished rooms that are inhabited for four hours a day or more, such as bedrooms, playrooms, family rooms, or

B. if it will be renovated for purposes where it will be inhabited for four hours a day or more.

Place the device in a basement area that is or will be used for 4 or more hours each day. If the basement does not have any areas where people spend 4 or more hours per day (i.e. work, play or sleep), the test on the main level.

Room(s) in which radon detector placed

LOCATION IN THE ROOM

The preferred device location is:

- near an interior wall at a height of 0.8 to 2 m (3 to 6.5 feet) from the floor in the typical breathing zone.
- at least 50 cm (20 inches) from the ceiling and 20 cm (8 inches) from other objects so as to allow normal airflow around the detector.
- approximately 40 cm (16 inches) from an interior wall or approximately 50 cm (20 inches) from an exterior wall.
- Do not place the detector near heating, ventilating, and air-conditioning vents, doors, fans, windows, fireplaces, electrically powered equipment, television sets, stereos and speakers, or in direct sunlight. Air currents, sources of heat, and electrically powered appliances can affect some measurement devices.

Did placement conform to preferred device locations? ◯ *Yes* ◯ *No*
If no, explain here:

Some detectors may have further instructions for placement.

Did the detector include further instructions on placement not yet mentioned on this checklist?
◯ *Yes* ◯ *No*
If so, please state what they are.

Did you follow those instructions? ◯ *Yes* ◯ *No*

Further explanations if necessary.

3 Measurement Process

Health Canada recommends that every homeowner test their home for radon through the placement of at least one long-term detector for a minimum of 3 months. Ideally, this testing period should be when indoor radon levels are highest. In Canada, this is typically during the heating season from October to April, when homeowners keep windows closed for extended periods of time, and heating systems tend to create negative pressure, drawing more radon into the home.

BEGINNING THE TEST

Individual radon detectors have instructions for starting the test (such as removing from a bag).

Please state requirements of your device for beginning the radon test.

Did you follow the requirements? ◯ *Yes* ◯ *No*

It is important to record date radon test begun

Date Radon Test begun

Is your living space normally heated by this date?
◯ *Yes* ◯ *No*

ENDING THE TEST

Health Canada recommends at least 3 months, but in many cases longer tests are acceptable.

Date Radon Test ended

Individual radon detectors may have instructions for ending the test (such as placing into an envelope).

Please state requirements of your device for beginning the radon test.

Did you follow the requirements? ◯ *Yes* ◯ *No*

4 Acquiring and Interpreting Results

After the monitoring period is complete, return the detector to the certified radon professional or analytical laboratory for processing and evaluation of radon concentrations.

Was a certified radon professional involved?
◯ *Yes* ◯ *No*
If so, name of certified radon professional

Did you send the radon detector to a laboratory?
◯ *Yes* ◯ *No*
If so, name of laboratory or company handling testing

Radon Test Result: Average radon levels in Bq/m³

Attach laboratory results if available.

5 Signature

Your Name

Signature

Date

6 Declaration

If this form is to be used in legal proceeding (such as before the Residential Tenancy Branch), please consider having it notarized as follows:

I solemnly declare or make oath that I followed the procedure in this checklist, that I filled it in honestly, and the contents I have added are true.

Your Name

Signature

Date

Witness (fill in name and signature or stamp below)