

Build Radon Resistant Homes in Indigenous Communities

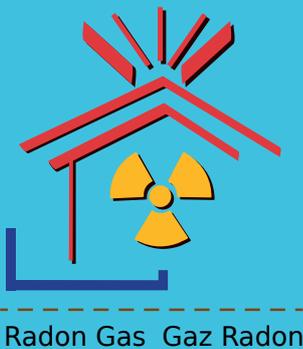
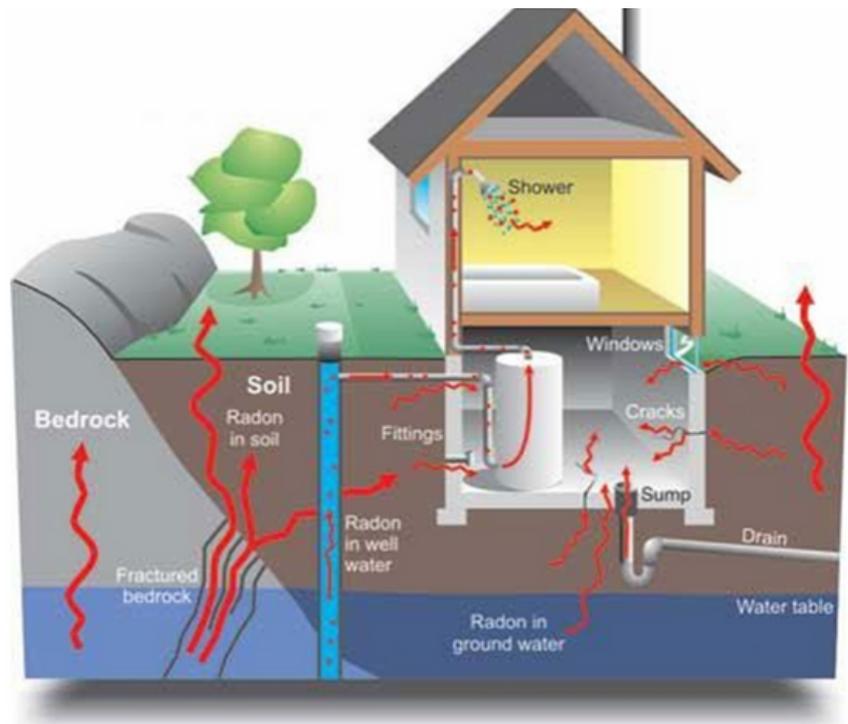


Photo courtesy of Roger L. Bird of Montreal Lake Cree Nation

Why Build Radon Resistant Homes?



Source: Natural Resources Canada

INTRODUCTION

Many of the Indigenous communities located on Turtle Island may have radon gas issues. Radon is a colourless, odorless, radioactive gas formed by the decay of uranium in the ground. Long term exposure to radon gas can pose a serious threat to health. Radon concentrations vary across Turtle Island and can also vary from home to home.

Breathing radon gas is the leading cause of lung cancer in people who don't smoke and significantly increases the risk of lung cancer for smokers and those exposed to second hand smoke. A smoker also exposed to high levels of radon for years has a 1 in 3 risk of developing lung cancer.

Radon enters a house through cracks in foundation walls and floor slabs, construction joints, gaps around service pipes, floor drains, sump pumps, crawl spaces and dirt floors.

Poorly built homes/improperly built homes contribute to increased radon exposure. Radon gas levels can be much higher in Indigenous communities where homes have open porous floor of basement/crawl space; cracked floors; open sump holes; poor ventilation; lack of insurance coverage, and ongoing mortgage and poor incomes to cover repairs. Homes in our communities are closed or heated most of the year, trapping radon inside the home and resulting in higher levels of radon.

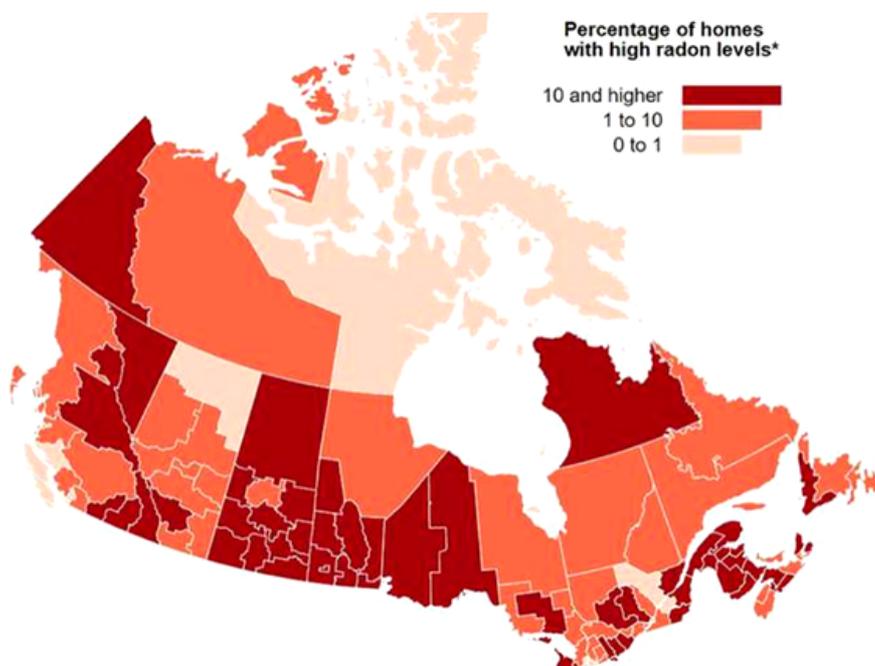
Many Indigenous communities are located on bedrock that contains higher levels of uranium. These communities could benefit from building Radon Resistant Homes. Building homes with less radon reduces lung cancer risk and save lives within the community. Better to build a Radon Resistant Home to reduce the risk of lung cancer due to radon exposure from the beginning, as you can save money. It is easy and cheap to include a radon passive stack during the construction of new homes. To install a radon mitigation system after construction can be very expensive depending on how radon gas enters the home and moves within it.

Radon Gas and Indigenous Communities

Radon is a serious public health concern in Indigenous communities, and you CAN do something about it. You can build Radon Resistant Homes. Building Radon Resistant Homes is like building dugout cedar or bark canoes. Well-built canoes cannot leak and are built to be safe for family and the community. The same principles should apply to a community's homes to stop radon gas leaking into the home.

Look at the map and locate your community. If your community is in an area where between 1 and 10 percent (medium orange on map) of homes have high radon levels, it is best to build Radon resistant homes.

Where the percentage of homes with high radon levels is 10 percent or higher (red areas on map), we recommend that homes **MUST** be built as Radon Resistant Homes.



Source: Health Canada

Foundation Types in Indigenous Communities Affect Radon Entry

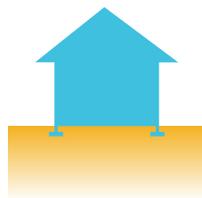
All conventional house construction types used in our communities have been found to have high radon levels.

Our homes are like a vacuum on the ground. Radon is sucked into the home because of the air pressure difference in the home and the ground it is built on.



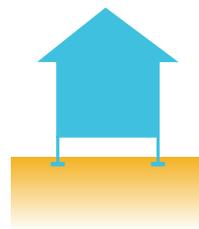
BASEMENT

Radon can enter through floor-to-wall joints and control joints and cracks in the slab.



SLAB-ON-GRADE

Radon can enter a home regardless of whether there is a basement. Slabs built on grade can have just as many openings to allow radon to enter as do basements.



CRAWLSPACE

The air pressure inside homes is slightly lower than in the ground which draws in radon gas from earthen underneath the house. The warmer air inside the house moves naturally upwards and this “stack effect” reduces air pressure in the crawlspace or basements.



MANUFACTURED HOMES

Unless manufactured homes are set up on piers without any skirting around them, interior vacuums can cause radon leaks.

Radon Measures in New Homes



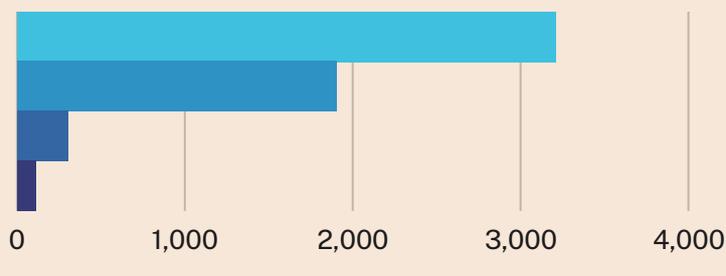
Radon levels in a home can vary depending upon occupant use patterns. Currently, there is no way to predict what radon concentrations will be in a built home before construction.

Radon levels are high in many Indigenous communities. It is best to assume that most new homes will have radon gas in them and to build Radon Resistant Homes to reduce the risk of lung cancer for the occupants.

Radon-induced lung cancer is serious but preventable. The risk of dying from radon gas is higher than from car accidents, house fires and carbon monoxide poisoning combined.

ANNUAL DEATHS IN CANADA

- deaths from radon-induced lung cancer
- deaths from car accidents
- deaths from carbon monoxide
- deaths from house fire



Source: Canada (2017). Radon gas: it's in your home

Radon Resistant Construction

The purpose of radon resistant homes is to reduce the occupant's exposure to radon gas and improve indoor air quality. Homes built in Indigenous communities that are in 10 percent or more zones (see red areas on map above) must design and build with radon resistance construction techniques.

Important standards have been developed to build Radon Resistant Homes to help Indigenous communities.

In January 2020, the Canadian General Standards Board (CGSB) released a standard to provide technical recommendations for radon control measures in new low-rise residential buildings.

The standard outlines radon mitigation techniques, materials, products and installation and is intended for use by contractors. Where possible, it is important to have at least one individual on site (or connected through video conferencing) who is trained in the application of radon reduction. Organizations such as FNNBOA or the Canadian National Radon Proficiency Program (C-NRPP) can provide information on radon mitigation training for new construction.

RADON RESISTANT CONSTRUCTION STANDARDS

The standard outlines three levels of basic construction that are to be completed during the construction phase to either reduce radon gas entering the building or to prepare the home for radon mitigation in the future.

The three levels of protection from radon ingress are the following:

1

Rough-in for active soil depressurization

2

Full passive vertical radon stack

3

Full active soil depressurization system

For more information about the three levels and the detail requirements, it is best to read the standard: [CAN/CGSB-149.11-2019](#).

Most provinces and territories already require protection from radon at level 1 in all new homes and there is work currently being done to have level 2 added to the National Building Code. Level 3 requirements in the national standard are intended for higher risk areas.

In communities where radon risk is higher (orange and red areas of the map on the previous page) Councils should require a minimum of a level 2 radon resistant construction of homes. Recent research has shown that installation of level 2 passive vertical radon stack can reduce radon levels by 50-80%. This approach will give you Radon Resistant Homes that will be safer for all your community members.

1. After construction, it is important to conduct a 3 month radon test within the first year of occupancy to confirm if mitigation is needed or to confirm that a Level 2 and Level 3 system is functioning properly. Testing every 5 years after is recommended.
2. Level 3 systems require periodic monitoring required and should be incorporated into the home operations and maintenance.

Radon Resistant Construction

Understanding the standards on radon gas can be a challenge. For help, there are associations that can provide their expertise to build Radon Resistant Homes and install full radon mitigation systems if required. These include:

Canadian Association of Radon Scientists and Technologists (CARST)

Pam Warkentin
Executive Director

Email
info@carst.ca

Web **Phone**
carst.ca (204) 798-9649

Canadian National Radon Proficiency Program (C-NRPP)

Pam Warkentin
Executive Director

Email
info@c-nrpp.ca

Web **Phone**
c-nrpp.ca (204) 798-9649

First Nations National Building Officers Association (FNNBOA)

John Kiedrowski
Project Manager

Email
info@fnnboa.ca

Web **Phone**
fnnboa.ca (613) 236-2040

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Photo courtesy of Roger L. Bird of Montreal Lake Cree Nation

