WORKING TOGETHER to PREVENT LUNG CANCER

A Guide to help you with testing your Workplace for Radon

PURPOSE:

This document provides building owner/managers with information on testing workplaces for radon. We recommend that testing be done by Radon Measurement Professional certified with the Canadian National Radon Proficiency Program (C-NRPP), however we acknowledge that it is important for building owners/managers to have some understanding of the process.

Radon is in the ground naturally, but it can get into buildings through contact with the ground.

WHAT IS RADON?

Radon is an odourless, tasteless, colourless, radioactive gas. Radon is in virtually all the air we breathe, but becomes a serious health issue when too much accumulates inside a building.

WHERE DOES RADON COME FROM?

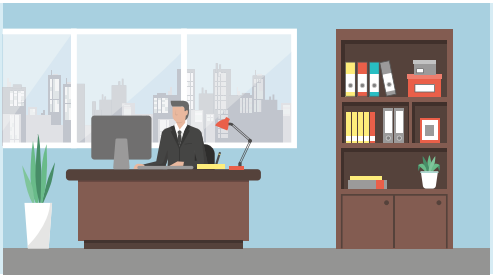
This document provides building owner/managers with information on testing workplaces for radon. Once it becomes a gas it can move from the ground to the air above. Due to the nature of buildings there is often a lower pressure inside buildings compared to the air below and therefore the soil gas enters the building.

Any building that has contact with the ground can have radon. If the radon does not exit the building at the same or greater rate than it enters, the levels inside the building can concentrate. The greater the concentration of radon, the greater the health risk to the occupants breathing the air.

HEALTH EFFECTS OF RADON?

Exposure to radon increases the risk of developing lung cancer. When radon (and its decay products) decay, they release energy which can create mutations in the DNA of the lung tissue cells. The greater the concentration of radon, the greater the health risk to the occupants breathing the air.

If you and your employees work in an indoor environment, you should test your workplace for radon.



RADON IS THE NUMBER ONE CAUSE OF LUNG CANCER IN NON-SMOKERS AND GREATLY INCREASES THE RISK FOR SMOKERS. RADON IS LINKED TO OVER 3200 ALL LUNG CANCERS IN CANADIANS.

PROTECT YOUR WORKPLACE FROM RADON

Elevated levels can be found in all types of buildings all over Canada. The only way to know if a building has radon is to test the air using a radon detector.

NO AREA IS RADON FREE

The health risk from radon is from long term exposure to elevated radon levels. Levels can change daily or seasonally and so recommendations focus on long term testing, which is a radon test lasting 90 days or more.

TESTING BUILDINGS

Health Canada has developed guidelines on how and where to place tests. This booklet will provide some basic information regarding reducing high levels, re-testing or follow up actions. This is not intended to be a replacement to Health Canada's radon measurement guidelines.

You can hire a professional who is certified with the Canadian National Radon Proficiency Program (C-NRPP) to conduct the testing for you. A professional will ensure that your tests are placed properly, provide independent analysis and report for your stakeholders and will assist you in interpretation and determining direction once the results are known. A C-NRPP Radon Measurement Professional will also be a resource available for such things as, speaking at with staff, and/or other stakeholders to help answer questions.

Find a certified professional at www.c-nrpp.ca.

WHAT TESTS SHOULD I USE?

INFORMATION ON TEST DEVICES

There are two main types of test devices that may be used for testing workplaces, including alpha track and electret ion devices. These devices each measure the radioactivity of radon in the air to provide a measurement of average radon level for occupant exposure.

The tests do not have any chemical or harmless materials inside which would be harmful if knocked over or touched. The results of the devices will be more accurate if they are not moved or shaken, so try to choose a suitable location that will be able to stay in place for the duration of the test (minimum 91 days).

ALPHA TRACK DETECTORS: these detectors use a small piece of special plastic enclosed in a container. The detector is exposed to the air for a specified time. When the radon in the air enters the chamber, the alpha particles released by the decay of the radon leave marks on the plastic. When the detector is returned to the lab and analyzed by the lab, the average radon concentration is calculated.

ELECTRET ION CHAMBERS: these detectors use a disk which has an electrostatic charge. When the detector is exposed to the air for a specified time, the radon in the air enters the chamber, the decay of the radon releases ions which reduce the electric charge. When the detector is returned to the lab and analyzed by the lab, the average radon concentration is calculated.

A List of these different devices can be found at www.c-nrpp.ca/approved-radon-measurement-devices/

HOW MANY TESTS DO I NEED?

The number of tests used will depend on the structure and size of the building

Areas which are occupied or likely to be occupied by a person for 4 hours a day or more, should be tested.

More specific details on how to determine the number of tests needed and placement of tests can be found in Health Canada's: Radon Measurements in Public Buildings (Workplaces, Schools, DayCares, Hospitals, Care Facilites, Correctional Centres)

WHAT TO DO IF LEVELS ARE ELEVATED?

Health Canada recommends that radon levels in buildings be below 200 Bq/m^3.

When conducting radon tests in a building, there is always a chance that results may show that levels are above the Health Canada guideline. Fixing a building is an important step in the process of reducing radon levels and preventing radon-related lung cancer.

MITIGATING A RESIDENTIAL STRUCTURE:

A C-NRPP Mitigation Professional is trained to mitigate a residential structure and will be trained in identifying the best method to reduce levels in a building.

MITIGATING OTHER BUILDINGS:

If the workplace is located in a commercial building or a structure which is not a residential type structure, then the relevant worker should look at a C-NRPP Certified Mitigation Professional who has taken training in Large Building Mitigation.

REDUCING RADON LEVELS

The most typical type of mitigation system is called an **Active Slab Depressurization System.** This method involves installing a pipe through the foundation floor and attaching a fan that runs continuously to draw the radon gas from below the home and release it into the outdoors where it is quickly diluted. More information on this can be find in the booklet, *Radon Reduction Guide for Canadians,* published by Health Canada.

A C-NRPP Mitigation professional will conduct some additional tests before a system is installed.

- **Additional Testing**
- **Survey of the Building and System Design**

Additional testing will help in determining how levels change throughout the day. This information combined with the original radon test results will help them with determining if mitigation is required and what type of system will be needed.

A survey of the building and system design will also be needed to provide a more accurate quote on installing a full system.

Engineering Controls

Engineering controls can be used to reduce radon levels including installing an active soil depressurization system, sealing major entry routes for radon or making adjustments to building ventilation systems. If radon levels are found to be above the Canadian guideline, mitigation methods are available and effective in lowering levels. Health Canada recommends that a professional certified under the C-NRPP be hired.

Administrative Controls

Administrative controls can be used to reduce radon exposure. This can include relocating workspaces to rooms with lower levels or reducing the amount of time spent by workers in areas where excess radon may be present is one example of such a control. If these measures are used it is important to use regular testing to ensure alternate spaces are not affected by high levels.

NOTE: PERSONAL PROTECTIVE EQUIPMENT

PPE is the least effective means of protecting employees from exposures. Proper use of PPE requires a comprehensive and diligent program, ensuring that employees are involved and committed to the decision to implement as a practice. Since reduction of radon levels is achievable in most buildings, this is only suggested in special circumstances. NIOSH-approved respirators for radionuclides and radon decay products may be used to reduce worker exposure.

Contact a certified professional in your area.
Find a list of professional at www.c-nrpp.ca

DEVELOPING A REQUEST FOR PROPOSAL (RFP)

When developing a Request for Proposal to have mitigation work done, it is important to understand aspects of mitigation.

Building Survey and System Design will also be needed to provide a more accurate quote on installing a full system. It may be useful to have a C-NRPP Mitigation Professional provide diagnostics testing and system recommendations and/or design before developing an RFP for full system installation.

It is important that the required specs and information is known in order for a contractor to develop an accurate quote for the full installation. There are specifications that should be met for piping type, discharge distances and installation processes available. These can be provided by a C-NRPP Mitigation Professional as part of the Building Survey and System Design.

COMMUNICATING THE INFORMATION:

Communicating the process of testing and the possible need for mitigation is an important part of the process. It is often helpful for staff to know about the process before it starts and provide them with opportunity to ask questions.

It is also helpful to have staff understand that you are doing this for their benefit. It may also be helpful to have them provide input on which rooms should be tested and where to place the tests, so they are out of the way in a space that won't have to be moved or thrown out.

Letters that are sent staff can include some basics of radon; the process of testing, including dates of beginning and approximate ending of test periods; and other relevant follow up information. A sample letter can be found in Appendix 1 and can be downloaded from **www.c-nrpp.ca**.

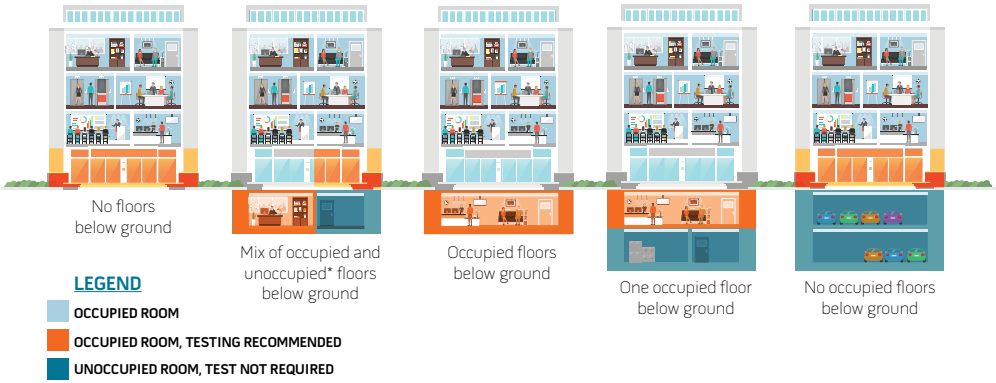
It may also be beneficial to include an information session for staff. This will give them the opportunity to have a question and answer session and information on how to test their own home. A C-NRPP certified professional can be contacted to help with this.

There are additional resources/handouts that you can give refer to or provide to relevant stakeholders. They are listed in Additional Resources.

GUIDANCE FOR PLACING TESTS IN A WORKPLACE/PUBLIC BUILDING

How to Test

Use Long-term radon measurements to test all occupied rooms with floors or walls that are in direct contact with the ground or a crawl space. If none of these levels have occupied rooms, test all occupied rooms on the first occupied level.



**A C-NRPP Measurement Professional should be consulted to determine the best choice of rooms for each situation.*

Occupied is defined as a room where an individual spends 4 hours per day or more
Rooms are defined as the space enclosed by walls that reach from floor to ceiling (or false ceiling).
Thus cubicles would not be treated as individual rooms. The entire square footage occupied by cubicles would be needed and the area (200 m^2) would be treated as one room.
Tests will be placed and left in location for at least 91 days.

Where to Locate the Detector

Choose a location for the device which is:

- by an interior wall in the typical breathing zone
- 20 cm (8 inches) from other objects
- 40 cm (16 inches) from an interior wall
- 50 cm (20 inches) from an exterior wall

Do **not** place the detector by heating, ventilating and air conditioning vents, doors, fans, windows, fireplaces, electrically powered equipment, on computers, television sets, stereos or speakers, or in direct sunlight.

Quality Control Program

A C-NRPP Measurement Professional would ensure a Quality Assurance program is used which will include the use of additional detectors.

ADDITIONAL RESOURCES

Health Canada Publications:

Radon Measurements in Residential Dwellings (Homes),
http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radon_homes-maisons/index-eng.php

Radon Measurements in Public Buildings

(Workplaces, Hospitals, Care Facilities, Correctional Centres),
http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radon_building-edifices/index-eng.php

Radon - What you need to know,
http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/radon/index-eng.php

Radon Reduction Guide for Canadians,
http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radon_canadians-canadiens/index-eng.php

Workplace Health and Safety Information online:
http://www.hc-sc.gc.ca/ewh-semt/radiation/radon/index-eng.php

Alberta:
https://work.alberta.ca/documents/ohs-bulletin-rad007.pdf

British Columbia:
https://www.worksafebc.com/en/health-safety/hazards-exposures/radon

Ontario:
https://www.labour.gov.on.ca/english/hs/pubs/gl_radon.php

Manitoba:
http://www.gov.mb.ca/health/publichealth/environmentalhealth/radon.html

New Brunswick:
http://www.worksafenb.ca/radon-in-the-workplace?alttemplate=Printable&

Nova Scotia:
http://pubs.ciphi.ca/doi/pdf/10.5864/d2013-006
http://www.novascotia.ca/lae/pubs/docs/nsel-accountability2008.pdf
http://www.wcb.ns.ca/Portals/wcb/Mersereau_Radon_Breaking_New_Ground.pdf

Quebec:
https://www.inspq.qc.ca/pdf/publications/476-RadonInQuebec-Feuillet.pdf

Saskatchewan:
http://www.worksafesask.ca/prevention/environmental-risks/radon-gas/

Public Service Alliance of Canada:
http://psacunion.ca/radon-workplace

Canadian Environmental Law Association (CELA) Publication:
Radon in Indoor Air: A Review of Policy and Law in Canada,
http://www.cela.ca/sites/cela.ca/files/Radon-Report-with-Appendices_0.pdf

VIDEO Resources:
Mike Holmes' on Radon
https://www.youtube.com/watch?v=UnqIPtZt3Go

David Suzuki Foundation, Queen of Green on Radon
https://www.youtube.com/watch?v=eXcwJBrsXqo

Date

NAME OF BUILDING OR COMPANY is being surveyed to determine if there might be elevated concentrations of radon gas. Personnel accredited by the Canadian National Radon Proficiency Program have been retained by COMPANY NAME to conduct this survey.

This survey is being done as a precautionary measure, since it is not known if a potential radon problem exists in the facility.

Radon is a naturally occurring gas that can sometimes enter a building and build up to concentrations which can cause a health concern over time. If elevated levels of radon gas are found, there are a number of ways to fix the problem.

The testing will be conducted from:

Start Date: _____ – End Date: _____

They will be placed in several rooms throughout the building on DATE, and picked up on DATE. Placement may occur outside of normal occupancy hours. The tests do not have any chemicals or materials inside which would be harmful if knocked over or touched. Please do not disturb the devices or do anything else that could restrict good air movement around it. If, by accident, a test kit is moved or damaged in any manner, please inform CONTACT PERSON.

Your cooperation is very much appreciated.

Sincerely,

Building Manager

Administrative Offices:
Toll free: 1-855-722-6777
e-mail: info@c-nrpp.ca
www.c-nrpp.ca

www.carst.ca
info@carst.ca