Radon in the workplace

OHS information for work site parties

This bulletin provides information about radon as a potential workplace hazard. It also introduces applicable guidelines and occupational health and safety requirements.

KEY INFORMATION

- Radon is a naturally occuring gas that may be present in workplaces.
- Long-term exposure to high levels of radon in indoor air increases the risk of lung cancer.
- OHS requirements apply where radon has been identified as a workplace hazard.

About radon

What radon is

Radon is a radioactive gas with no colour, smell or taste. It is formed by the natural breakdown of uranium in soil, rock and water. As a soil gas, radon can move freely through the ground. When radon is released into the air, it breaks down further into additional radioactive elements, called “radon progeny”.

Where you can be exposed to radon

Radon is found across Canada and concentrations vary greatly by region.

Certain types of work carry an elevated risk of exposure to radon. Examples include:

- Oil and gas production (because of their proximity to hydrocarbon-bearing geological formations).
- Mining, tunneling and underground workings (including electrical vaults, tunnels, subways or sewer systems) due to naturally occurring radon underground.
- Water treatment processes.
- Metal recycling.

Elevated levels of radon can also occur in buildings. The amount of radon in a building depends on many factors, including:

- Soil characteristics at the building site.
- The building’s design and construction (which affect the number and size of entry points for radon, as well as airflow through the building).
- Foundation condition: foundations with cracks and openings have more potential entry points for radon.
- Ventilation: HVAC systems, exhaust fans, and window use can all influence the pressure difference between the building and the soil. This pressure difference can draw radon indoors and influences the rate of exchange of outdoor and indoor air.
- Weather and season can affect the amount of radon that enters a building. Higher radon levels are usually observed during winter

Health effects

Exposure to radon increases the risk of developing lung cancer. Long-term exposure to radon is the leading cause of lung cancer for people who have never smoked and the second leading cause of lung cancer overall. The risks of radon exposure are greater for people who smoke or who have smoked in the past, and for those who are exposed to second-hand smoke.

Radon exposure is linked to approximately 16 per cent of lung cancer deaths in Canada.

Monitoring and testing

Exposure limits

Work sites where naturally occurring radioactive materials (including radon) may be present in significant amounts – such as mines, fish hatcheries, oil and gas sites or water treatment facilities – may require radiation protection measures to reduce exposure. In these cases, the Canadian Guidelines for Management of Naturally Occurring Radioactive Materials (NORM) will apply. These guidelines include recommended radiation dose limits.

For other work sites (with an occupancy of more than four hours a day), public buildings and residential homes, Health Canada and the Federal Provincial Territorial Radiation Protection Committee have set a

Canadian radon guideline. This guideline – based on scientific risk assessment and public consultation – recommends corrective actions if average annual radon levels in the normal occupancy area of a building exceed 200 becquerels per cubic meter (Bq/m$^{3)}$.

NORMAL OCCUPANCY AREA
The Canadian radon guideline defines "normal occupancy area" as any part of a building where a person is likely to spend at least four hours per day. This excludes any area that is normally closed off or accessed infrequently.

Who tests
Under Alberta's *Occupational Health and Safety (OHS) Act*, employers have a general duty to ensure – as far as reasonably practicable – the health, safety and welfare of workers and other persons at their work site.

Under Part 2 of the Occupational Health and Safety (OHS) Code, employers must assess a work site and identify existing and potential hazards before work begins or a new work site is built.

OWNER OR EMPLOYER?
Owners are a regulated work site party under the OHS Act. Owners are defined in Section 1 of the act. Their general duties – from Section 9 of the act – include ensuring that their property is healthy and safe.

If an employer doesn't own the property where work is carried out, they may have to take their health and safety concerns to the owner or their designate (for example, a property manager who acts on behalf of the owner).

If an employer is also an owner, they must meet the requirements of both roles.

Testing options
Where applicable, the Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM) strongly recommend that "a person knowledgeable in radiation protection conduct (a) work site radiological evaluation."

At other sites, it may be appropriate and reasonable to test for radon by using an approved do-it-yourself radon test kit and following the instructions carefully. Radon measurement professionals can also carry out testing or give advice on properly placing tests.

- Visit takeactiononradon.ca to learn about radon test kits, including how to order an approved test kit.
  - Radon test kits include instructions on how to set up the test and send it to a lab for analysis when the testing period is over.
  - Long-term tests (90 days or more) during winter months are typically recommended.
- Radon measurement professionals certified under the Canadian National Radon Proficiency Program (C-NRPP) are listed at c-nrpp.ca.
  - Health Canada recommends hiring a radon measurement professional certified under the C-NRPP.

Reporting concerns

If you suspect that you or a co-worker may be exposed to radon at the work site, report your concern to your employer or supervisor.

The OHS Act requires all work site parties to co-operate to carry out duties under the act, regulation and OHS Code. If your employer doesn't address a health and safety concern, you can contact the Occupational Health and Safety Contact Centre by email or phone (see "Contact us" on the last page of this bulletin).

Eliminating or controlling radon as a workplace hazard

Under Part 2 of Alberta's OHS Code, employers must eliminate workplace hazards or – where that isn't reasonably practicable – control them.

At work sites – again, as applicable – the Canadian radon guideline recommends:

- Taking corrective action whenever the average annual radon concentration exceeds 200 Bq/m^3 in a building's normal occupancy area.
- The higher the radon concentration, the sooner corrective action should be undertaken.
- Reducing the radon concentration as much as is practicable.

- Constructing new building using techniques that minimize radon entry and will help with radon removal (if needed) when the buildings are finished.

It may also be relevant for employers with home-based businesses to know that Health Canada recommends hiring a certified radon professional to determine the best and most cost-effective way to reduce radon levels in residential homes. Per Health Canada, "A radon mitigation system can be installed in less than a day and in most homes will reduce the radon level by more that 80% for about the same cost as other home repairs."

As with radon measurement professionals, Health Canada recommends that radon mitigation professionals be certified by the C-NRPP.

Engineering controls

Engineering controls isolate people from a hazard. Next to eliminating a hazard, controlling it at the source is the most effective way to prevent injury or illness to a worker. If engineering controls are reasonably practicable, they must be used to control a hazard that can't be eliminated.

Examples of engineering controls that may apply in relation to radon risks in a specific building include:

- Installing an active soil depressurization system.
- Sealing major entry routes for radon (for example, cracks and holes in foundation floors and walls).
- Covering sump pumps and drains.
- Increasing air circulation by regularly opening windows or by installing mechanical ventilation.

Administrative controls

Administrative controls change the way people work, to reduce or prevent exposure to workplace hazards. If neither elimination nor engineering controls are reasonably practicable, administrative controls are the next option that an employer must put in place.

Reducing the amount of time spent by workers in areas where excess radon may be present is an example of an administrative control to reduce exposure to radon.

Personal protective equipment

Personal protective equipment (PPE) is the employer's third line of defense for controlling hazards that can't be eliminated. It's the least effective means of protecting employees from exposure.

Proper use of PPE requires a comprehensive and diligent program, as well as a high level of employee involvement and commitment to be effective.

Where radon exposure has been identified as a workplace hazard, and engineering and administrative controls aren't sufficient to protect workers, employers can provide and require use of NIOSH- or CSA-approved respirators for radionuclides and radon progeny to reduce worker exposure.

- If you want to use respiratory protective equipment approved by another organization at your work site, you must apply for and receive an approval from Alberta Occupational Health and Safety.

Directions about proper selection and use of PPE are in Part 18 of the OHS Code. The basic obligation to ensure workers use required PPE is shared between employers, supervisors and workers.

OHS ACT, PART 1, SECTION 5(1)(C)

"Every worker shall, while engaged in an occupation, … at all times, when the nature of the work requires, use all devices and wear all personal protective equipment provided for the worker's protection by the worker's employer or required to be used or worn by the worker by this Act, the regulations and the OHS Code."

OHS CODE, PART 1, SECTION 3.2

"If a worker is required under the Act, the regulations or this Code to use or wear specific equipment or personal protective equipment, the employer and supervisor must ensure that the worker uses or wears the equipment or personal protective at the work site."

For more about hazard assessment and control, read Hazard Assessment and Control: a handbook for Alberta employers and workers.

Contact us

OHS Contact Centre

Alberta toll-free
- 1-866-415-8690

Edmonton region
- 780-415-8690

Deaf or hard of hearing (TTY)
- 1-800-232-7215 (Alberta toll-free)
- 780-427-9999 (Edmonton region)

Notify OHS of health and safety concerns
alberta.ca/file-complaint-online

Call the OHS Contact Centre if you have concerns that involve immediate danger to a person on a work site.

Report a workplace incident to OHS
alberta.ca/ohs-complaints-incidents

Website
alberta.ca/ohs

Get copies of the OHS Act, Regulation and Code

Alberta King's Printer
alberta.ca/alberta-kings-printer

OHS
alberta.ca/ohs-act-regulation-code

For more information

Applying for an OHS acceptance or approval (LI030)
ohs-pubstore.labour.alberta.ca/li030

Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials (NORM)
canada.ca/en/health-canada/services/publications/health-risks-safety/canadian-guidelines-management-naturally-occurring-radioactive-materials.html

Canadian National Radon Proficiency Program (C-NRPP)
c-nrpp.ca/

Canadian radon guideline
canada.ca/en/health-canada/services/health-risks-safety/radiation/radon/government-canada-radon-guideline.html

Hazard Assessment and Control: a handbook for Alberta employers and workers
ohs-pubstore.labour.alberta.ca/bp018

Legal terms 101: "reasonably practicable"
ohs-pubstore.labour.alberta.ca/lgt001

Take Action on Radon
takeactiononradon.ca/

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