Welcome to the Foundation of a Radiation Safety Program (Nuclear) Webinar

THE WEBINAR WILL BEGIN SHORTLY

Radiation Safety Institute of Canada
Institut de radioprotection du Canada

Good Science in Plain Language®

2017

Webinar Functionality

- Audience is in silent mode
  - Only the presenter's audio will be transmitted
- Audio: use computer or telephone (call in)
- Use the "Questions/Chat" feature to ask questions or enter comments
  - Will be answered at the end of the webinar

Webinar Functionality

- A copy of the presentation is available as a handout in the “handouts” section, which you can download at any time during the webinar

- After the webinar, when the recording becomes available and has been added to our website, a link to the webinar will be sent to participants

Information about Attendees

- We would like some information about you and your radiation experience

- We will use the polling feature of the webinar system

Foundation of a Radiation Safety Program (Nuclear)

Tara Hargreaves, MSc, CRPA(R)
Staff Scientist and Manager of Training
Radiation Safety Institute of Canada

Radiation Safety Institute of Canada
Institut de radioprotection du Canada

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2017

In This Session…

- Canadian Nuclear Safety Commission Licensing Process

- Building a Radiation Safety Program

CNSC Licensing Process

Licences for nuclear sources are granted by the Canadian Nuclear Safety Commission

Class I

- Nuclear Power Plants, Uranium Mines

Class II

- Accelerators (1 MeV up to 50 MeV), Irradiators

Nuclear Substances and Radiation Devices

- The vast majority of licensed sources

CNSC Licensing Process

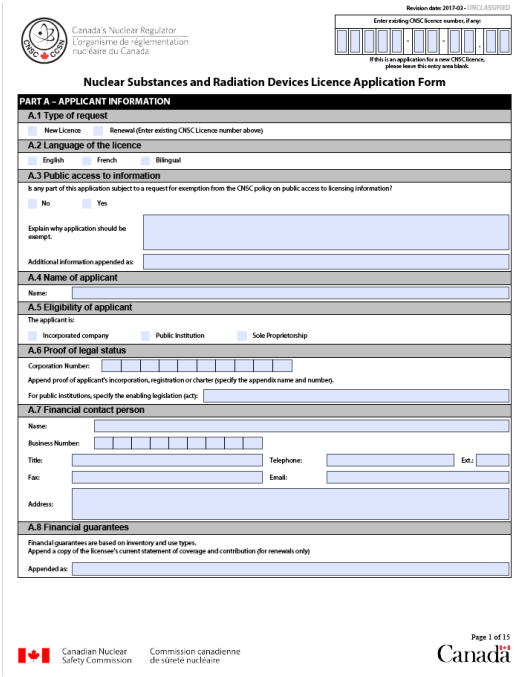
Get all the forms

Develop/refine your radiation safety program

Submit the application package

CNSC Licence Application Forms

http://nuclearsafety.gc.ca/eng/resources/forms/nuclear-substances-and-radiation-devices-forms.cfm



Canada's Nuclear Regulator
L'organisme de réglementation nucléaire du Canada

Revision date: 2017-03 - UNCLASSIFIED

Enter existing CNSC licence number, if any:

If this is an application for a new CNSC licence, please leave this entry area blank.

Nuclear Substances and Radiation Devices Licence Application Form

PART A – APPLICANT INFORMATION

A.1 Type of request
New Licence Renewal (Enter existing CNSC Licence number above)

A.2 Language of the licence
English French Bilingual

A.3 Public access to information
Is any part of this application subject to a request for exemption from the CNSC policy on public access to licensing information?
No Yes
Explain why application should be exempt.
Additional information appended as:

A.4 Name of applicant
Name:

A.5 Eligibility of applicant
The applicant is:
Incorporated company Public Institution Sole Proprietorship

A.6 Proof of legal status
Corporation Number:
Append proof of applicant's incorporation, registration or charter (specify the appendix name and number).
For public institutions, specify the enabling legislation (act):

A.7 Financial contact person
Name:
Business Number:
Title: Telephone: Ext.:
Fax: Email:
Address:

A.8 Financial guarantees
Financial guarantees are based on inventory and use types.
Append a copy of the licensee's current statement of coverage and contribution (for renewals only)
Appended as:

Canadian Nuclear Safety Commission Commission canadienne de sûreté nucléaire

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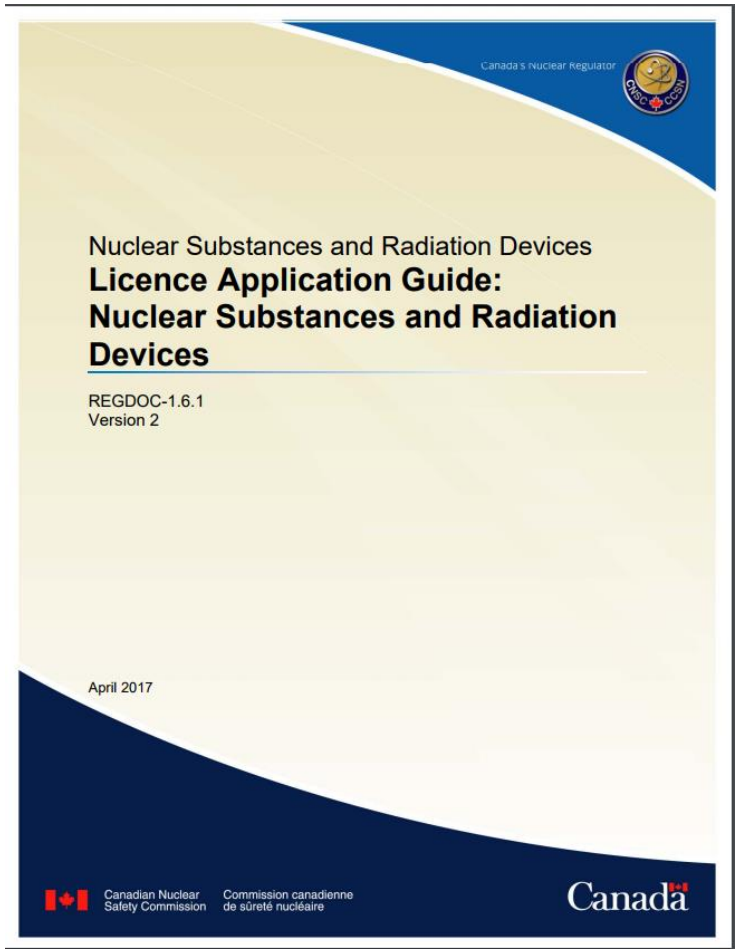
Canada



Canada's Nuclear Regulator

Nuclear Substances and Radiation Devices

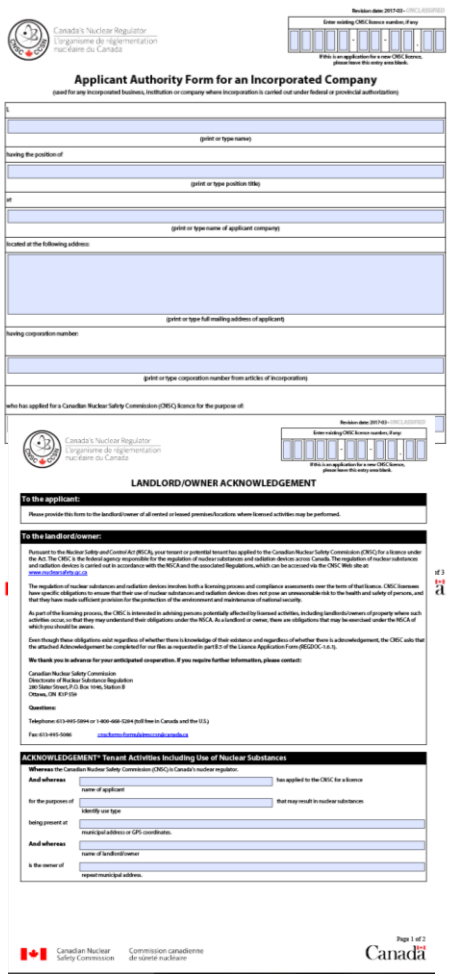
Licence Application Guide: Nuclear Substances and Radiation Devices

REGDOC-1.6.1
Version 2

April 2017

Canadian Nuclear Safety Commission Commission canadienne de sûreté nucléaire

Canada



Canada's Nuclear Regulator
L'organisme de réglementation nucléaire du Canada

Revision date: 2017-03 - UNCLASSIFIED

Enter existing CNSC licence number, if any:

If this is an application for a new CNSC licence, please leave this entry area blank.

Applicant Authority Form for an Incorporated Company

(used for any incorporated business, institution or company where incorporation is carried out under federal or provincial authorization)

I,
(print or type name)
having the position of
(print or type position title)
of
(print or type name of applicant company)
located at the following address:
(print or type full mailing address of applicant)
having corporation number:
(print or type corporation number from articles of incorporation)
who has applied for a Canadian Nuclear Safety Commission (CNSC) licence for the purpose of:

Canada's Nuclear Regulator
L'organisme de réglementation nucléaire du Canada

Revision date: 2017-03 - UNCLASSIFIED

Enter existing CNSC licence number, if any:

If this is an application for a new CNSC licence, please leave this entry area blank.

LANDLORD/OWNER ACKNOWLEDGEMENT

To the applicant:
Please provide this form to the landlord/owner of all rented or leased premises/locations where licensed activities may be performed.

To the landlord/owner:
Pursuant to the Nuclear Safety and Control Act (NSCA), your tenant or potential tenant has applied to the Canadian Nuclear Safety Commission (CNSC) for a licence under the Act. The CNSC is the federal agency responsible for the regulation of nuclear substances and radiation devices across Canada. The regulation of nuclear substances and radiation devices is carried out in accordance with the NSCA and the associated Regulations, which can be accessed via the CNSC Web site at www.nuclearsafety.gc.ca.

The regulation of nuclear substances and radiation devices involves both a licensing process and compliance assessments over the term of that licence. CNSC licensees have specific obligations to ensure that their use of nuclear substances and radiation devices does not pose an unreasonable risk to the health and safety of persons, and that they have made sufficient provision for the protection of the environment and maintenance of national security.

As part of the licensing process, the CNSC is interested in advising persons potentially affected by licensed activities, including landlords/owners of property where such activities occur, so that they may understand their obligations under the NSCA. As a landlord or owner, there are obligations that may be exercised under the NSCA of which you should be aware.

Even though these obligations exist regardless of whether there is knowledge of their existence and regardless of whether there is acknowledgement, the CNSC asks that the attached Acknowledgement be completed for our files as requested in part B.5 of the Licence Application Form (REGDOC-1.6.1).

We thank you in advance for your anticipated cooperation. If you require further information, please contact:

Canadian Nuclear Safety Commission
Directorate of Nuclear Substance Regulation
280 Slater Street, P.O. Box 1046, Station B
Ottawa, ON K1P 5S9

Questions:
Telephone: 613-995-5894 or 1-800-668-5284 (toll free in Canada and the U.S.)
Fax: 613-995-5086 cnscforms-formulaires@cnsc-ccsn.gc.ca

ACKNOWLEDGEMENT* Tenant Activities Including Use of Nuclear Substances

Whereas the Canadian Nuclear Safety Commission (CNSC) is Canada's nuclear regulator.

And whereas _____ (name of applicant) has applied to the CNSC for a licence for the purposes of _____ (identify use type) that may result in nuclear substances being present at _____ (municipal address or GPS coordinates.)

And whereas _____ (name of landlord/owner) is the owner of _____ (repeat municipal address.)

Canadian Nuclear Safety Commission Commission canadienne de sûreté nucléaire

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Canada

Radiation Safety Program

Licence Application

Part C	Part D	Part E
Radiation Protection Program	Radiation Safety Program Policies and Procedures	Specific Requirement Based on Proposed Licence Activity

RS Program Development

- When applying for a licence, a detailed radiation safety program document must be included in the application.
- Often, the development of a this document is a joint effort between:
  - Senior Management
  - Radiation Safety Committee
  - RSO
  - Permit holders
- A professional consultant may be asked to assist in the preparation of the radiation safety program document.

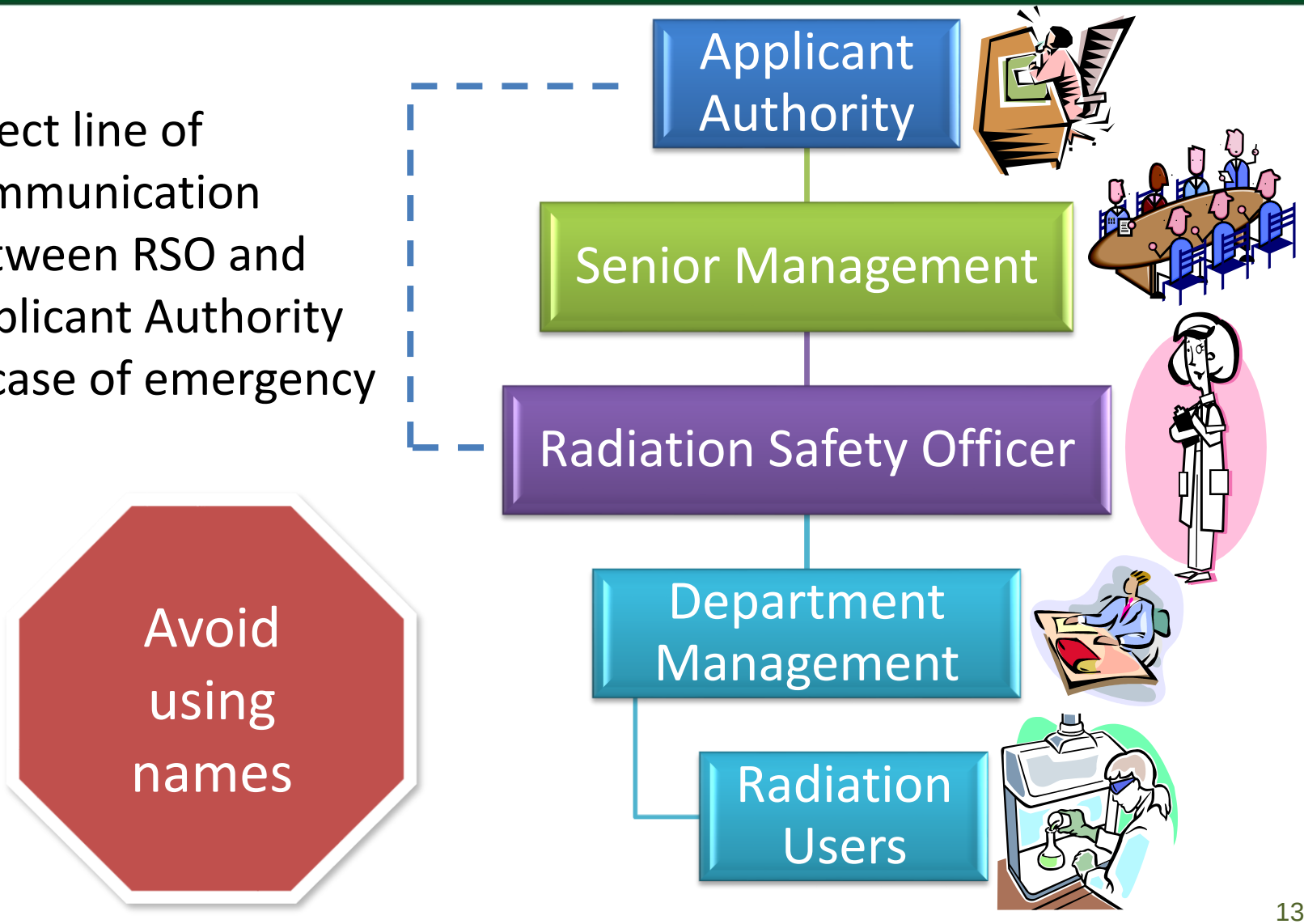
RS Policy: Typical Elements

- ALARA
- Classification of workers
- Worker training and authorisation
- Ascertaining and recording dose
- Action levels
- Control of radioactive contamination
- Radiation detection instruments
- Leak testing of sealed sources
- Access control and security
- Receipt of Packages
- Packaging and transportation
- Controlling possession
- Management of waste
- Emergency procedures
- Decommissioning
- Records and reporting
- Posting of warning signs
- Classification of rooms
- Internal Review
- Specific procedures for the licence purpose

RS Organizational Structure: Example

Direct line of communication between RSO and Applicant Authority in case of emergency

Avoid using names



RSO Job Description

Duties should be relevant to the type of licence and use of the nuclear substance or radiation device.

Accountabilities may include:

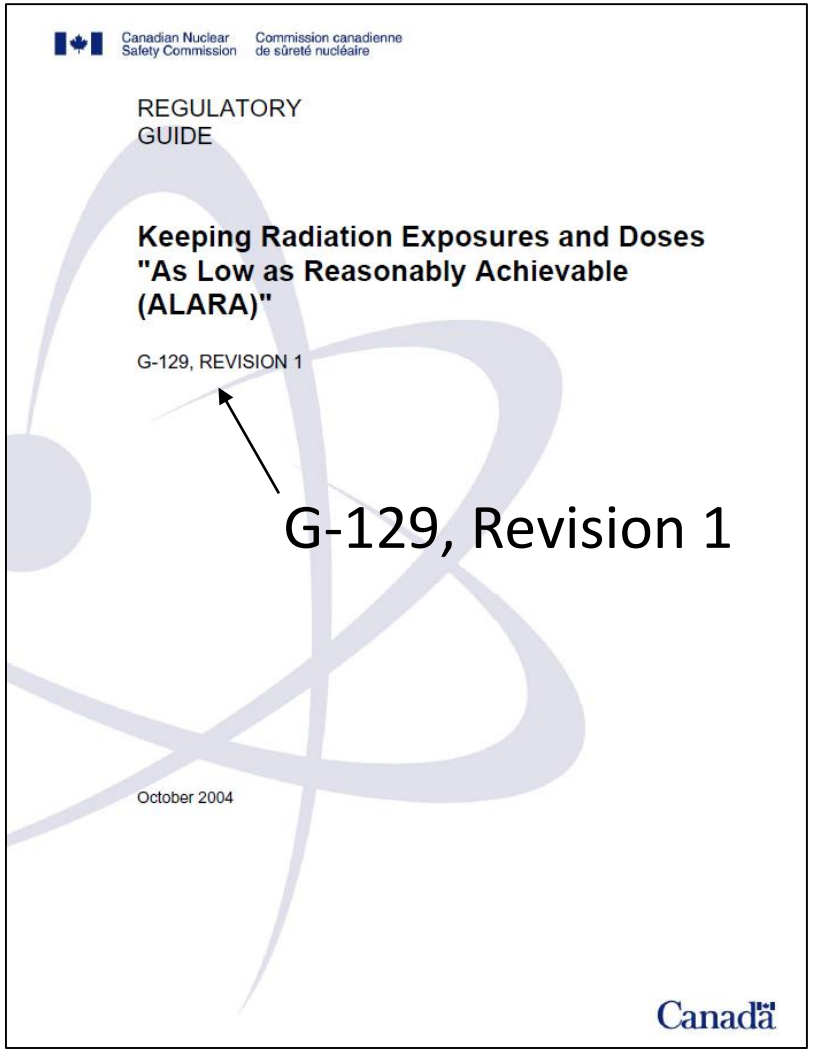
- Inspections and audits
- Ensuring proper use of sources
- Training staff
- Record keeping
- Managing incidents
- Controlling security and storage
- Disposal/decommissioning
- Packaging and transport
- Contact person for the CNSC
- Ensuring regulatory compliance

Licence application guide is a great starting point!

ALARA

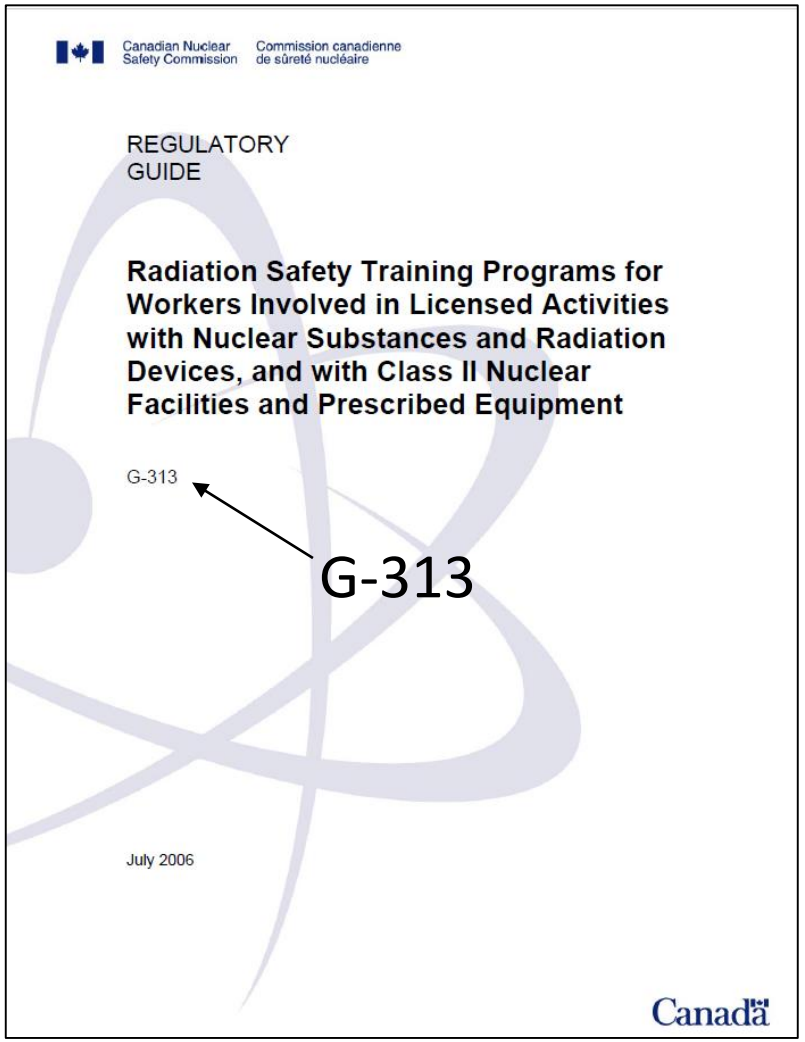
- Licensees and employers are required to establish an ALARA (*As Low As Reasonably Achievable*) policy

- Recognize that it is **not sufficient** for a licensee to simply respect the appropriate dose limits.



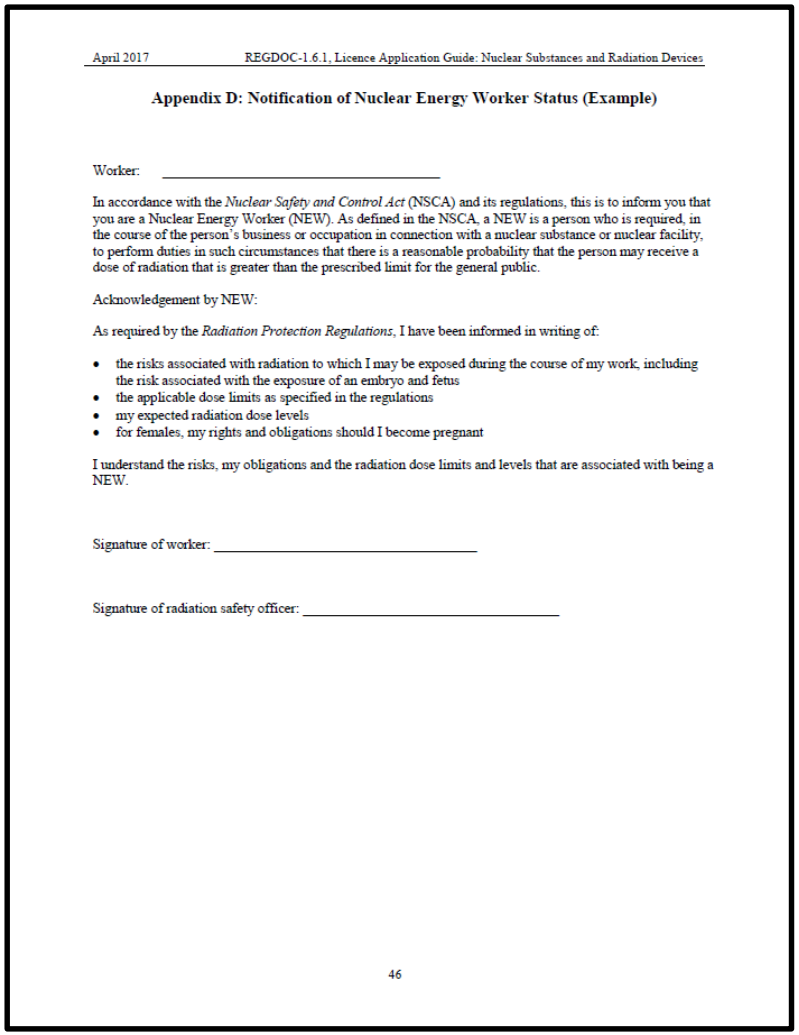
Classification of Workers

- Classify workers
  - Radiation/Authorized User
  - NEWs
- Use job categories not specific names, outline duties
  - List of worker names is kept separately
- Appendix A
  - Categories of Workers to be Considered



NEW Designation

- Justify NEW designations with calculation of dose or use of historical dose records.
- Attach a sample of the NEW designation notification form given to the workers.



April 2017 REGDOC-1.6.1, Licence Application Guide: Nuclear Substances and Radiation Devices

Appendix D: Notification of Nuclear Energy Worker Status (Example)

Worker: _____

In accordance with the *Nuclear Safety and Control Act* (NSCA) and its regulations, this is to inform you that you are a Nuclear Energy Worker (NEW). As defined in the NSCA, a NEW is a person who is required, in the course of the person's business or occupation in connection with a nuclear substance or nuclear facility, to perform duties in such circumstances that there is a reasonable probability that the person may receive a dose of radiation that is greater than the prescribed limit for the general public.

Acknowledgement by NEW:

As required by the *Radiation Protection Regulations*, I have been informed in writing of:

- the risks associated with radiation to which I may be exposed during the course of my work, including the risk associated with the exposure of an embryo and fetus
- the applicable dose limits as specified in the regulations
- my expected radiation dose levels
- for females, my rights and obligations should I become pregnant

I understand the risks, my obligations and the radiation dose limits and levels that are associated with being a NEW.

Signature of worker: _____

Signature of radiation safety officer: _____

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Worker Training

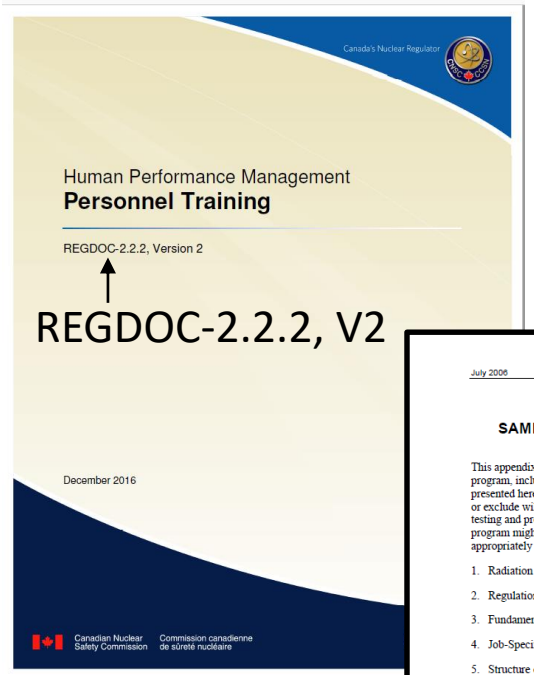
- **Policy:** only appropriately trained persons are **authorized** to handle nuclear substances and radiation devices.

- Specify training provider:
  - **Internally** by qualified personnel.
  - **External agency**.

Don’t forget refresher training! Every 2 to 5 years.

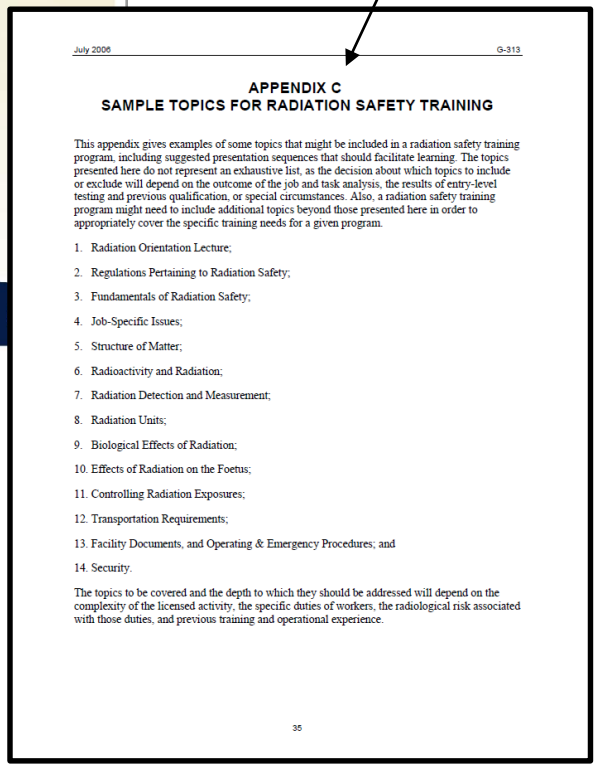
Worker Training

- Provide a detailed description of the training program:
  - Delivery method
    - Online, in-class, on-the-job
  - Topics covered
    - See G-313
  - Assessment
    - None, test, skills demonstration



REGDOC-2.2.2, V2

G-313


July 2006 G-313

APPENDIX C
SAMPLE TOPICS FOR RADIATION SAFETY TRAINING

This appendix gives examples of some topics that might be included in a radiation safety training program, including suggested presentation sequences that should facilitate learning. The topics presented here do not represent an exhaustive list, as the decision about which topics to include or exclude will depend on the outcome of the job and task analysis, the results of entry-level testing and previous qualification, or special circumstances. Also, a radiation safety training program might need to include additional topics beyond those presented here in order to appropriately cover the specific training needs for a given program.

1. Radiation Orientation Lecture;
2. Regulations Pertaining to Radiation Safety;
3. Fundamentals of Radiation Safety;
4. Job-Specific Issues;
5. Structure of Matter;
6. Radioactivity and Radiation;
7. Radiation Detection and Measurement;
8. Radiation Units;
9. Biological Effects of Radiation;
10. Effects of Radiation on the Foetus;
11. Controlling Radiation Exposures;
12. Transportation Requirements;
13. Facility Documents, and Operating & Emergency Procedures; and
14. Security.

The topics to be covered and the depth to which they should be addressed will depend on the complexity of the licensed activity, the specific duties of workers, the radiological risk associated with those duties, and previous training and operational experience.

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Remember, the RSO needs training too!

Ascertaining and recording dose

- Provide dose workers are expected to receive:
  - Estimated through calculation
  - Based on historical dosimetry records

- Personal Dose Monitoring:
  - Will dosimetry be used? If not, why not?
    - Refer to regulatory requirement (5 mSv/year)
  - Name the service provider

Action Levels

- Many licences **do not** require action levels.
- Set reasonable action levels
  - Should serve as a warning of a problem with the radiation safety program
  - Should not be regularly exceeded
- Include actions taken if action levels are exceeded.

Control of Radioactive Contamination

- Only include contamination control procedures for open sources
  - Frequency of contamination monitoring
  - Areas monitored
  - Recording results
  - Acceptable levels
  - Decontamination methods

Radiation Detection Instruments

- List all radiation detection instruments
- Include frequency of calibration
  - Hint: every 12 months for survey meters
- Include method of calibration
  - Name service provider
  - Indicate that they follow the expectations of the CNSC as outlined in Appendix Z of Regdoc-1.6.1, the licence application guide

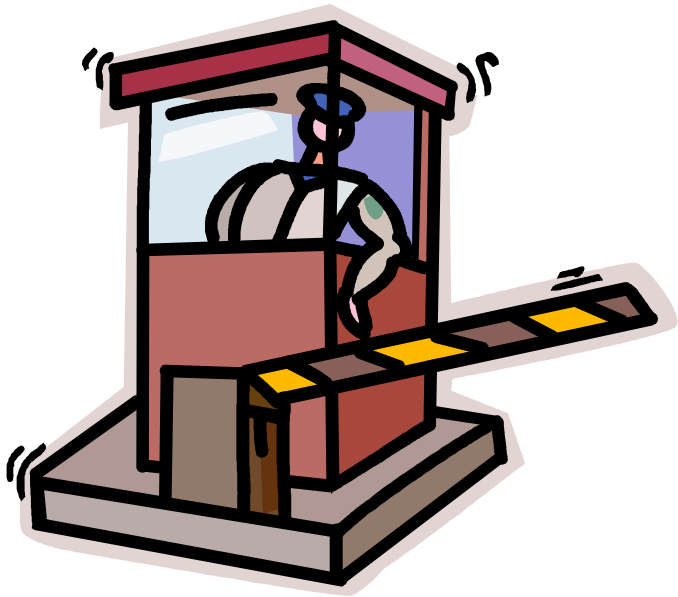
Credit: Thermo Electron Corporation

Leak Testing

- Outline procedures for the **leak testing** of sealed sources and/or radiation devices:
  - Necessary?
    - Activities of 50 MBq or more
  - Frequency of tests?
    - 6 months for sealed sources
    - 12 months for sealed sources in radiation devices
  - Method?
    - Name service provider
    - Indicate they follow the expectations of the CNSC as outlined in Appendix AA of Regdoc-1.6.1

Access Control and Security

- Controlling access of employees to sources
  - Only authorized users should have access
- Security:
  - Worker background checks
  - Guards
  - Locks
  - Etc.
- Regdoc-2.12.3



Receipt of Packages, Transport

- Who is permitted to receive sources?
- Will anyone be transporting sources?
- Who is permitted to package sources for shipping?
- TDG Certificates
- Shipping documents

Control of Nuclear Substances

- Nuclear substances and radiation devices need to be accounted for from the time they are acquired to the time they are transferred or disposed.
  - Acquisitions
  - Inventories
  - Transfers
  - Releases

- Management and disposal of waste must also be documented.

Use & Storage Locations

- Use and storage locations MUST be listed in the radiation protection program as part of the licence application.
  - Specific address
  - Specific room
  - Use throughout province or country
- If the location isn't listed, the source isn't permitted there
  - Need amendment to add locations

Posting of Signs

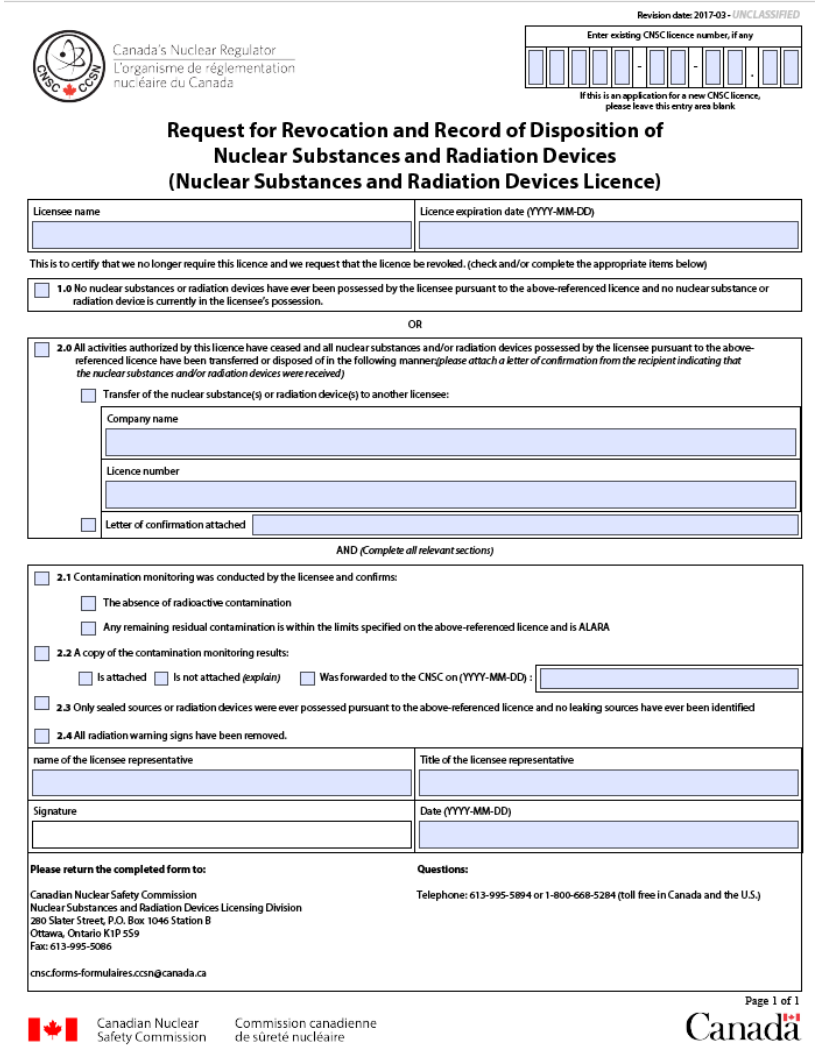
- Include policy on the appropriate posting of radiation warning signs:
  - Where the quantity of nuclear substance is greater than **100 times** its exemption quantity
  - Radiation dose rates are greater than **25 µSv/hr**

Emergency Procedures

- Append or refer to the applicant's policies and procedures for emergencies (spills, fires):
  - Notification of RSO
  - Call emergency responders
  - Notification of CNSC, IMMEDIATELY
  - Evacuation of area
  - Monitoring of dose rates
  - Monitoring for contamination

Decommissioning

- Procedures related to decommissioning licensed locations.
  - A location can't be released from CNSC's regulatory control until authorised by the CNSC



Revision date: 2017-03 - UNCLASSIFIED

Canada's Nuclear Regulator
L'organisme de réglementation nucléaire du Canada

Enter existing CNSC licence number, if any

If this is an application for a new CNSC licence, please leave this entry area blank

Request for Revocation and Record of Disposition of Nuclear Substances and Radiation Devices (Nuclear Substances and Radiation Devices Licence)

Licensee name	Licence expiration date (YYYY-MM-DD)

This is to certify that we no longer require this licence and we request that the licence be revoked. (check and/or complete the appropriate items below)

☐ **1.0** No nuclear substances or radiation devices have ever been possessed by the licensee pursuant to the above-referenced licence and no nuclear substance or radiation device is currently in the licensee's possession.

OR

☐ **2.0** All activities authorized by this licence have ceased and all nuclear substances and/or radiation devices possessed by the licensee pursuant to the above-referenced licence have been transferred or disposed of in the following manner *(please attach a letter of confirmation from the recipient indicating that the nuclear substances and/or radiation devices were received)*

☐ Transfer of the nuclear substance(s) or radiation device(s) to another licensee:

Company name

Licence number

☐ Letter of confirmation attached

AND *(Complete all relevant sections)*

☐ **2.1** Contamination monitoring was conducted by the licensee and confirms:

☐ The absence of radioactive contamination

☐ Any remaining residual contamination is within the limits specified on the above-referenced licence and is ALARA

☐ **2.2** A copy of the contamination monitoring results:

☐ Is attached ☐ Is not attached *(explain)* ☐ Was forwarded to the CNSC on (YYYY-MM-DD) :

☐ **2.3** Only sealed sources or radiation devices were ever possessed pursuant to the above-referenced licence and no leaking sources have ever been identified

☐ **2.4** All radiation warning signs have been removed.

name of the licensee representative	Title of the licensee representative
Signature	**Date (YYYY-MM-DD)**

Please return the completed form to:

Canadian Nuclear Safety Commission
Nuclear Substances and Radiation Devices Licensing Division
280 Slater Street, P.O. Box 1046 Station B
Ottawa, Ontario K1P 5S9
Fax: 613-995-5086

cnsc.forms-formulaires.ccsn@canada.ca

Questions:

Telephone: 613-995-5894 or 1-800-668-5284 (toll free in Canada and the U.S.)

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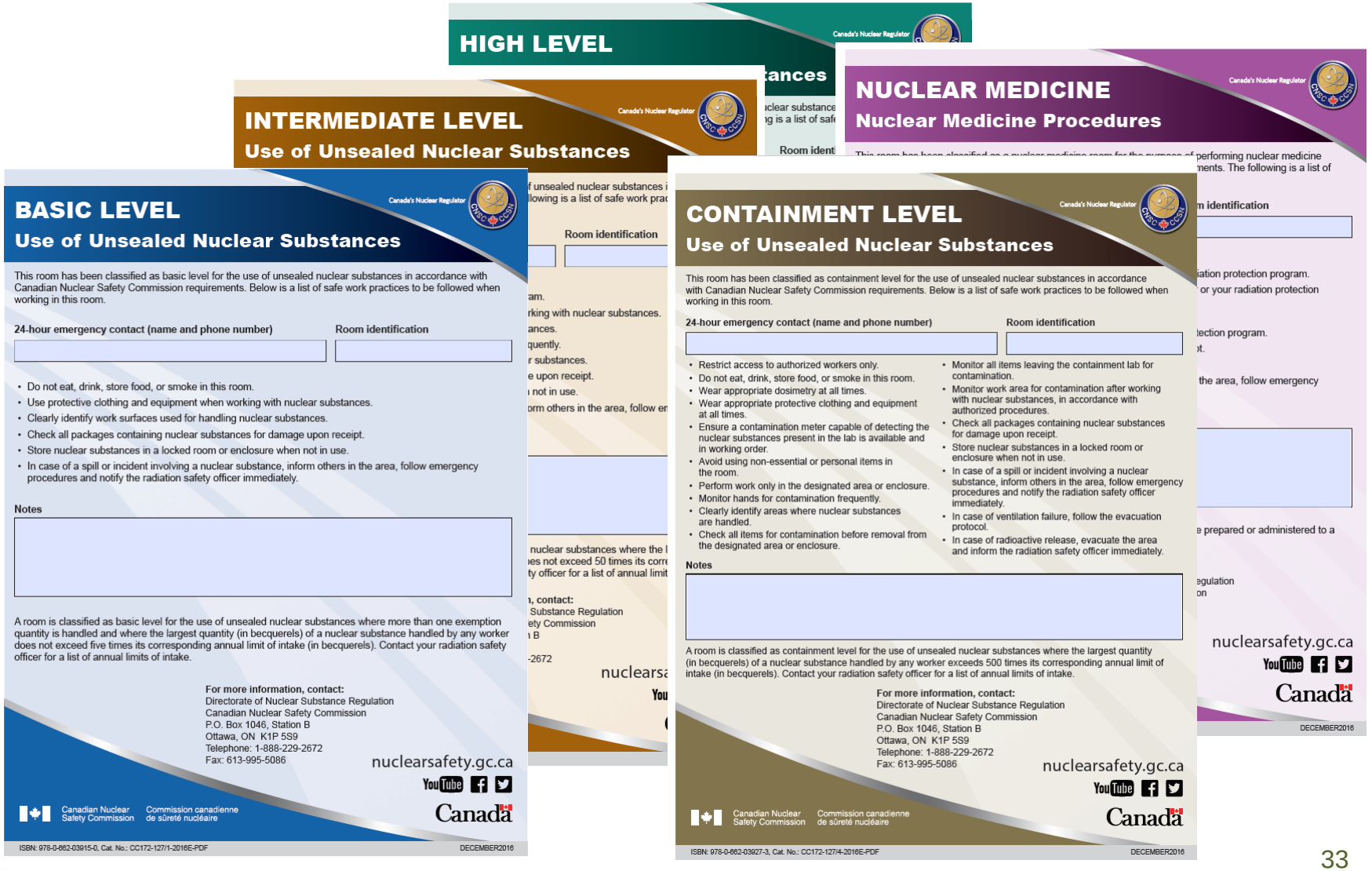
Canadian Nuclear Safety Commission / Commission canadienne de sûreté nucléaire

Canada

Records and Reporting System

- Policies and procedures for **records and reports:**
  - When is a report required to be made?
  - What records are required to be kept?
  - Where are the records and reports kept?
  - For how long are they retained?

Classification of rooms (unsealed)



HIGH LEVEL

INTERMEDIATE LEVEL
Use of Unsealed Nuclear Substances

NUCLEAR MEDICINE
Nuclear Medicine Procedures

BASIC LEVEL
Use of Unsealed Nuclear Substances

This room has been classified as basic level for the use of unsealed nuclear substances in accordance with Canadian Nuclear Safety Commission requirements. Below is a list of safe work practices to be followed when working in this room.

24-hour emergency contact (name and phone number) | Room identification

- Do not eat, drink, store food, or smoke in this room.
- Use protective clothing and equipment when working with nuclear substances.
- Clearly identify work surfaces used for handling nuclear substances.
- Check all packages containing nuclear substances for damage upon receipt.
- Store nuclear substances in a locked room or enclosure when not in use.
- In case of a spill or incident involving a nuclear substance, inform others in the area, follow emergency procedures and notify the radiation safety officer immediately.

Notes

A room is classified as basic level for the use of unsealed nuclear substances where more than one exemption quantity is handled and where the largest quantity (in becquerels) of a nuclear substance handled by any worker does not exceed five times its corresponding annual limit of intake (in becquerels). Contact your radiation safety officer for a list of annual limits of intake.

For more information, contact:
Directorate of Nuclear Substance Regulation
Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
Ottawa, ON K1P 5S9
Telephone: 1-888-229-2672
Fax: 613-995-5086

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Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Canada

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CONTAINMENT LEVEL
Use of Unsealed Nuclear Substances

This room has been classified as containment level for the use of unsealed nuclear substances in accordance with Canadian Nuclear Safety Commission requirements. Below is a list of safe work practices to be followed when working in this room.

24-hour emergency contact (name and phone number) | Room identification

- Restrict access to authorized workers only.
- Do not eat, drink, store food, or smoke in this room.
- Wear appropriate dosimetry at all times.
- Wear appropriate protective clothing and equipment at all times.
- Ensure a contamination meter capable of detecting the nuclear substances present in the lab is available and in working order.
- Avoid using non-essential or personal items in the room.
- Perform work only in the designated area or enclosure.
- Monitor hands for contamination frequently.
- Clearly identify areas where nuclear substances are handled.
- Check all items for contamination before removal from the designated area or enclosure.
- Monitor all items leaving the containment lab for contamination.
- Monitor work area for contamination after working with nuclear substances, in accordance with authorized procedures.
- Check all packages containing nuclear substances for damage upon receipt.
- Store nuclear substances in a locked room or enclosure when not in use.
- In case of a spill or incident involving a nuclear substance, inform others in the area, follow emergency procedures and notify the radiation safety officer immediately.
- In case of ventilation failure, follow the evacuation protocol.
- In case of radioactive release, evacuate the area and inform the radiation safety officer immediately.

Notes

A room is classified as containment level for the use of unsealed nuclear substances where the largest quantity (in becquerels) of a nuclear substance handled by any worker exceeds 500 times its corresponding annual limit of intake (in becquerels). Contact your radiation safety officer for a list of annual limits of intake.

For more information, contact:
Directorate of Nuclear Substance Regulation
Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
Ottawa, ON K1P 5S9
Telephone: 1-888-229-2672
Fax: 613-995-5086

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Internal Reviews

- Procedures for conducting internal compliance, monitoring, enforcement and verification of all licensed activities.

- Enforcement actions should be taken to encourage compliance and prevent ongoing non-compliances.

Part E

- Nuclear medicine and human research studies
- Therapeutic nuclear medicine
- Human research studies
- Consolidated uses of nuclear substances
- Industrial radiography
- Low-Risk use of nuclear substances and radiation devices
- Veterinary nuclear medicine
- Fixed gauges
- Petroleum exploration
- Portable gauges
- Servicing
- Manufacturing

Tips

- Use the licence application guide as a template
  - Copy from it!
- Use CNSC guides to help craft policies and procedures
- Refer to device operating manuals
- Search for RS manuals online
- Ask the CNSC questions! They can be very helpful.

Resources

- http://nuclearsafety.gc.ca/eng/resources/publications/index.cfm
- http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/index.cfm
- https://www.tc.gc.ca/eng/tdg/page-1288.html
- http://nuclearsafety.gc.ca/pubs_catalogue/uploads/record-retention-period-summary-2016-eng.pdf

Thank you for listening!

Good Science in Plain Language®

Radiation Safety Institute of Canada
Institut de radioprotection du Canada

Education

- Professional Certificate Courses in Radiation Safety
- Worker and Awareness Education
- Tailor-made Courses

Consulting

- Radiation Safety Workplace Audits
- CNSC Licence Support
- EMF Surveys and X-Ray Equipment Inspections

Laboratory

- Radon testing
- Personal Alpha Dosimetry
- Instrument Calibration
- Leak Testing

Awareness

- Free Information Service in Radiation Safety
- Public Education
- Public Policy

Free of charge information service in radiation safety:

Toll free line: 1-800-263-5803
Website: www.radiationsafety.ca
Email: info@radiationsafety.ca