# Legal Requirements



*For more information, refer to the Radiation Safety Manual, 2017 RSP-3*

## Regulatory CONTROL…

The Canadian Nuclear Safety Commission (CNSC) issues a licence to the University of Manitoba. A Principal Investigator (permit holder) applies to EHS for a permit. Anyone working with radioactive materials must be approved by EHS and be listed as designated workers on the permit.

- The CNSC can revoke a licence if the licensed activities are not in compliance with the regulatory conditions. Revoking the licence would end all the permits!
- The University of Manitoba can revoke a permit if the permit holder is not in compliance. The designated workers assist the permit holder in maintaining compliance.
- Each individual is still responsible for their own actions.
- *The CNSC cannot revoke a permit but they can issues fines to individual workers (minimum $300) and/or the University (minimum $1,000) for not following federal regulations or University procedures.*
- Other penalties can also be imposed if found guilty of contravening the Manitoba Workplace Safety & Health Act and regulations.

*Refer to the Radiation Safety Records Binder – Quick Step Guide for a Compliance Checklist of requirements.*

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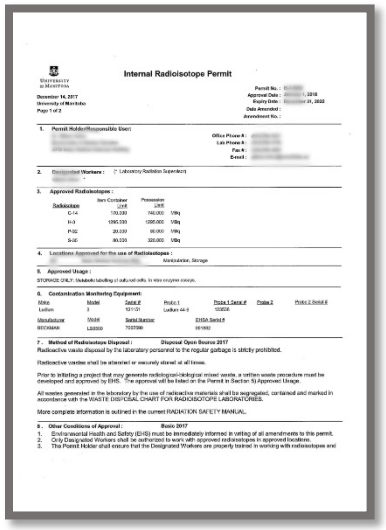
## What information is on the Internal Radioisotope Permit?



Internal Radioisotope Permit

- Permit Holder/Responsible User
- Laboratory Radiation Supervisor (LRS)
- Designated Workers
- Approved Radioisotopes (item limits and possession limits)
- Locations Approved for the use of Radioisotopes
- Approved usage including any required lab specific procedures
- Contamination Monitoring Equipment
- Methods of Radioisotope Disposal
- Other Conditions of Approval outlining
  - Records of monitoring
  - Inventory and usage
  - Dosimetry and Amendments

## How do I make changes to a permit (amendments)?

- Only the Permit Holder or LRS can request amendments
- Send an e-mail to radsafety@umanitoba.ca
- Indicate permit # and the changes requested
- The amended permit will be approved and signed by the chair of the Radiation Protection Committee, then scanned and emailed to the Permit Holder and LRS to be printed and posted in each room listed in section 4 of the permit.

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What are the radiation resources to help me stay compliant with the Regulations?

**Radiation Safety Manual**

- Hard copy should be accessible and up to date. Do you know where your lab copy is located?
- Updates to the manual are also on the web
- The up-to-date PDF Manual is on the web and searchable
- Radiation Safety Records Binder has section dividers with Quick Step Guides
- Quick Step Guide for Radioactive Chemical Compliance Checklist is a valuable overview of the requirements to meet regulatory compliance.

**EHS Radiation Safety web page short cut is http://umanitoba.ca/radsafety**

Check out the link to the Laboratory Safety Links web page for a list of links to many laboratory safety web resources!

**Training**

- To become a designated worker, you must complete the self-study and lab assignments (keep a copy of the lab assignment behind the last tab in the Radiation Safety Manual)
- Attend a Workshop within four months of completing the two assignments listed above to remain a designated worker
- Refresher training (required every three years) and review training booklets to stay up to date between refresher training
- Read EHS Radiation Safety Newsletters
- Review radiation awareness pamphlets with non-designated workers in the lab
- Be prepared for inspections (by CNSC or by EHS)
- Manitoba Workplace Safety and Health Act also requires regular inspections of the workplace. *Inspect your lab using the compliance checklist in the Radiation Safety Records Binder and review all radiation related procedures*

## What are the Compliance Requirements?

**Security of Radioactive Material**

- Radioactive stock vials/kits are to be stored in a locked fridge or cupboard, or in a lock box locked to the inside of a fridge or cupboard at all times
- The key to the locked storage shall only be accessible to the designated workers listed on the Internal Radioisotope Permit
- When the permitted room is unattended the door must be closed and locked

**Labelling Based on Exemption Quantities**

- There are two types of labels used at the University to indicate the possible presence of radiation. The label used depends on the amount or activity (MBq) of radioactive material present. The activity 'threshold' requiring a trefoil is defined in the regulations and is referred to as an exemption quantity (EQ).
- The EQ is radioisotope specific and is based upon current radiation protection knowledge and dose limits (international accepted standards). The EQ is calculated from models based upon assumptions for levels of risk from small quantities of nuclear material. The higher the EQ of a radioisotope, the lower the hazard is to you. A complete list of the radioisotopes that can be used at the University and their corresponding EQ can be found in the Radiation Safety Manual, 2017 Appendix D.

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The Exemption Quantities for the most commonly used radioisotopes at the University are:

| Radioisotope | Type of Emission | Energy (MeV) | Half-life | Exemption Quantity |
|---|---|---|---|---|
| H-3 | Beta- | Lowest 0.018 | 12 years | 1000 |
| C-14 | Beta- | Low 0.156 | 5730 years | 10 |
| S-35 | Beta- | Low 0.167 | 88 days | 100 |
| P-32 | Beta- | Mid 1.71 | 14 days | 0.1 |
| I-125 | X-ray/ Gamma | Low 0.035 | 60 days | 1 |
| Tc-99m | Gamma | Low 0.14 (85%) | 6 hours | 10 |
| Cr-51 | X-ray/ Gamma | Low 0.32 (10%) | 28 days | 10 |
| F-18 | Beta+/ Gamma | 0.633/0.511 | 109.8 minutes | 1 |
| I-124 | Beta+/ Gamma | 1.532/0.511 | 4.18 days | 0.01 |

**When there is more than 1 EQ of radioactive material, use the Radiation Warning Symbol (RWS) label.**

- The RWS is a magenta trefoil on a yellow background. This label would be used on:
  - Radiation storage areas for stock vials (fridge, lock box) and the waste storage area
  - Radiation work stations/bench and equipment in active use
- Remove or cover the RWS on areas or equipment when there is:
  - Less than or equal to 1 EQ of radioactive material present
  - No contamination detected after your weekly monitoring and you will not be use within a week. Indicate the action taken and the date on the contamination monitoring record and keep it in the records binder.

**When there is less than or equal to 1EQ of radioactive material use the striped tape.**

- The magenta and yellow striped tape does not have the RWS or the word radiation.
- This tape indicates these labelled areas or items are designated for use with radioactive material and could potentially be contaminated with radioactive material. The tape would be used on:
  - All designated radiation work areas and equipment
  - Items such as shields, pipettes, racks, pens, etc. when used in the designated radiation area.
- The tape must be removed when:
  - An item, equipment or area is decommissioned and will no longer be used with radioactive material, and
  - Contamination monitoring results indicate no removable contamination was detected. Keep a record of the contamination monitoring in the records binder.

**Postings**

In ALL rooms listed as Approved Locations, post:

- Most recent Internal Radioisotope Permit
- Waste Disposal Chart for Radioisotope Laboratories
- CNSC classification poster

Posted at every entrance door, up to date emergency contact information:

- A Permit Holder as the primary contact
- A secondary contact that is a designated worker on a current permit

*Contact EHS if an office number, home phone number, cell phone number or contact person has changed so we can update the database records.*

- The WHIP (lab signage) for radioisotope permitted areas is reversible! The RWS is on one side and should only be displayed when the room has more than 100 EQ of radioactive material. Note: very important if you order 500uCi of P32. See Appendix D on the Radiation Safety Manual for a list of EQs.

*Examples*

- A lab that only has P-32 would display the RWS when there is 10 MBq or 270 uCi.
    - Since P-32 has a half-life of 14 days, the WHIP would be reversed when the P-32 decays below 10 MBq.
- A lab with only C-14 would display the RWS when there is 1000 MBq (27000 uCi or 27 mCi) of C-14.

- When more than one radioisotope is stored in the room - to determine if there is 100EQ - divide the quantity of each radioisotope (MBq) by its corresponding 100 EQ MBq value, if the sum of these values exceeds 1 then the RWS should be displayed on the WHIP.

  E.g.

  | | | |
  |---|---|---|
  | P-32 | if there is | 9.25 MBq ÷ 10 MBq (100EQ) = 0.925 |
  | I-125 | | 2.77MBq ÷ 100MBq (100EQ) = 0.277 |
  | C-14 | | 74 MBq ÷ 1000MBq (100EQ) = 0.074 for a total of 1.276 |

  Since the total of all three radioisotopes is more than one, the RWS would be displayed but…

- The decay rate of the radioisotopes must be considered. In the example above, the WHIP will have to be reversed to the side with no RWS in 14 days.

  Why? P-32 has a 14 day half-life and will decay to 4.68 MBq, so the sum would be less than 1.

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100 Exemption Quantities for the most commonly used radioisotopes at the University are:

| Radioisotope | Type of Emission | Energy (MeV) | Half-life | Exemption Quantity (EQ) | 100 EQ |
|---|---|---|---|---|---|
| H-3 | Beta- | Lowest 0.018 | 12 years | 1000 | 100 000 |
| C-14 | Beta- | Low 0.156 | 5730 years | 10 | 1000 |
| S-35 | Beta- | Low 0.167 | 88 days | 100 | 10 000 |
| P-32 | Beta- | Mid 1.71 | 14 days | 0.1 | 10 |
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| F-18 | Beta+/ Gamma | 0.633/0.511 | 109.8 minutes | 1 | 100 |
| I-124 | Beta+/ Gamma | 1.532/0.511 | 4.18 days | 0.01 | 1 |

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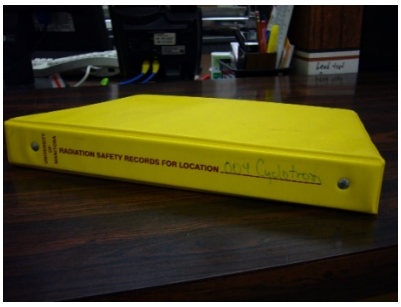
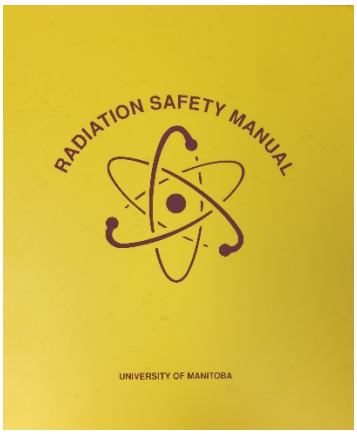
What records are required to demonstrate compliance?

**There is a Radiation Safety Records Binder in each room listed on a permit**




- Be sure the room and building are clearly labelled on the spine.
- We are encouraging the records to be kept in one binder – some binders will have a note saying which room the main records are stored.
- Arrange your records neatly behind the Quick Steps dividers – the easier it is to inspect, the better for everyone.
    - For contamination monitoring be sure the map of lab(s) is dated.
    - Weekly Contamination Monitoring or equivalent, chronological
    - Radioisotope Inventory Form (gold sheets or copies of disposed)

**Radiation Safety Manual – behind the light green tab**




- Copies of TDG certificates (receiving class 7 radioactives) for lab personnel
- All in lab site specific training related to Radiation Safety, signed by every designated worker listed on the permit, such as:
    - Radiological-Biological Waste Approval (RBWA). See waste module.
    - Approved Alternate Method of Detection. See contamination monitoring module.
    - Safe Work Procedures (RSOPs) that are listed as a condition on the Internal Permit
    - A copy of the Lab Assignment *effective September 14, 2016
- Keep all records for 8 years!

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*It is worth the effort to keep records organized!*

*It is important to discard the 9th year when instructed from Radiation Safety either through the Radiation Safety Newsletter or through the annual inventory reconciliation.*

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**Does the records binder in your lab contain the above items?**

## What are my responsibilities to maintain compliance as an individual?

- Follow Permit, Manual and site specific procedures
- Control security, exposures and releases
- Take workshop and site specific training and apply training to work practices
- Use prescribed protective items (lab coat, gloves, shielding, fume hood)
- Tell supervisor if unsafe
- Practice ALARA (As Low As Reasonably Achievable) in regards to your exposure
- Report radiation related incidents (risk to environment, security, permit conditions, loss, release or exposure)
- Not to endanger anyone

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*Refer to the Radiation Safety Manual, 2017 RSP-3 and the Quick Step Guides in the Radiation Safety Records Binders for a complete checklist of requirements.*

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