



For more information, refer to the Radiation Safety Manual, 2017 RSP-4



Regulatory CONTROL...

The Canadian Nuclear Safety Commission (CNSC) issues a licence to the University of Manitoba. A Principal Investigator (permit holder) applies to Environmental Health and Safety (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 issue 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 complete checklist of requirements (or a Compliance Checklist)



What information is on the Internal Radioisotope Permit?

Internal Radioisotope Permit

Permit No.: [Redacted] Approved Date: [Redacted] Issue Date: [Redacted]

December 16, 2017 University of Manitoba Permit Holder: [Redacted] Renewal Date: December 16, 2022

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1. Permit Holder/Responsible User: [Redacted] Office Phone #: [Redacted] Lab Phone #: [Redacted] Fax #: [Redacted] Email: [Redacted]

2. Designated Workers: Laboratory (List Name) [Redacted]

3. Approved Radioisotopes

Radioisotope	Activity	Maximum Allowed	Source
Co-60	100 MBq	0.001 MBq	20-303
Co-60	100 MBq	0.001 MBq	21-047
Co-60	100 MBq	0.001 MBq	20-303

4. Locations Approved for the use of Radioisotopes:

Location	Verification/Storage
[Redacted]	Verification/Storage
[Redacted]	Verification/Storage

5. Approved Storage: [Redacted]

6. Contamination Monitoring Equipment: [Redacted]

7. Method of Radioisotope Disposal: [Redacted]

8. Other Conditions of Approval: [Redacted]

- Permit Holder/Responsible User
- Laboratory Radiation Supervisor (LRS)
- Designated Workers
- Approved Radioactive Sources
- Locations Approved for the use of Radioisotopes
- Approved usage
- Methods of Radioisotope Disposal
- Other Conditions of Approval outlining
 - Leak testing requirements
 - Inventory and usage
 - Dosimetry and Amendments

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

- Only the Permit Holder or Laboratory Radiation Supervisor (LRS) can request amendments
- Send an e-mail to radsafety@umanitoba.ca
- Indicate permit number 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 to be printed and posted in each room listed in section 4 of the permit.



[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 Source 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 in the records binder)
- Refresher training (required every three years) and review training booklets to stay up to date between refresher training
- Read EHS 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 sealed sources and portable radiation devices 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
- While in use, radioactive sealed sources and radiation devices must be maintained secure from theft and unauthorized use. It is recommended when the permitted room is unattended the door should be closed and locked.

Labelling Based on Exemption Quantities

- CNSC is very particular about the use of the trefoil or Radiation Warning Symbol (RWS). The use of the label 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.



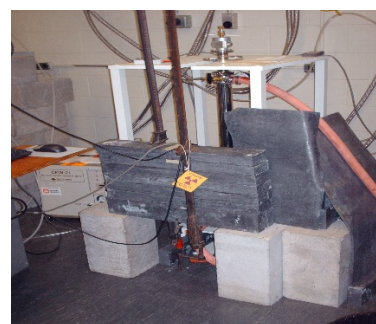
The Exemption Quantities for the most commonly used radioisotopes at the University are:

Radioisotope	Type of Emission	Energy (MeV)	Half-life	Shielding	EQ (MBq)	100 EQ
Am-241	Alpha, gamma	5.49, 0.60	432 years	Lead	0.01	1
Ba-133	gamma	0.36	10.51 years	Lead	1	100
Co-57	gamma	0.122	270 days	Lead	1	100
Co-60	Beta-, gamma	0.32, 0.17 and 1.33	5.27 years	Lead	0.1	10
Cs-137	Beta-, gamma	0.51, 0.662	30.17 years	Lead	0.01	1
Ge-68	Beta+, gamma	,0.511	271 days	Lead	0.1	10
Na-22	Beta+, gamma	0.54, 0.511 and 1.27	2.6 years	Lead	1	100
Ni-63	Beta-	0.067	101 years	Plastic or Wood	100	10 000
Ra-226	Alpha, gamma	4.78, 0.19	1602 years	Lead	0.01	1
Sr-90	Beta-	0.54 and 2.28	28.8 years	Plastic or Wood	0.01	1
Tl-204	Beta-	0.76	3.78 years	Plastic or Wood	0.01	1

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:
 - Radioactive sealed sources or radiation devices containing more than 1 EQ
 - Radiation storage or work areas containing more than 1 EQ
 - 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
 - Shipping containers and lead containers after the sealed source or radiation device is removed



Postings

In ALL rooms listed as Approved Locations, post the most recent Internal Radioisotope Permit.

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 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. See Appendix D on the Radiation Safety Manual

for a list of EQs. HINT: The decayed activity of the sealed sources is listed (as of the date printed) in section 3 on the permit.



Every order, transfer or replacement **MUST** be PRE-APPROVED by University Radiation Safety

How do I know if my order/replacement order/transfer has been approved by Radiation Safety?

- You will receive a hardcopy green Radioactive Source Inventory Log Form (“Green Sheet”) in the mail.
- The radioactive material information required to place the order/transfer is entered into a centralized inventory database, EHS then approves the order/transfer and creates the “green sheet” with a unique identifying serial number.
- Contact radsafety@umanitoba.ca if you receive a shipment and have not received the green sheet. You must have a green sheet for each sealed source or radiation device on your permit.

What do I need to do to get PRE-APPROVAL by EHS Radiation Safety?

The three most common ways to get pre-approval are described below – purchasing procedure, transfers to the University that are not arranged through Purchasing and transfers between University Permits. If you are unable to follow one of these procedures – contact EHS Radiation Safety to make alternative arrangements.

Purchasing procedure

- EPIC (the University’s eProcurement tool for ordering) requires training and an access request.
- Once access to EPIC is granted, create a requisition/order online by one of the following methods:
 - Catalog order – if the vendor’s catalogue is in EPIC
 - Non-catalog order: use the commodity code “Radioisotope Sources” with ID 12142207,

The instructions for placing a radioisotope orders are located on the web at:

http://umanitoba.ca/admin/vp_admin/risk_management/ehso/media/EPIC_Radioactive_Materials_Purchase.pdf

Transfers to the University, Orders and Replacement Orders that are not arranged via Purchasing

- To get a green sheet email radsafety@umanitoba.ca indicating the isotope, activity, company, permit holder’s name & permit number for approval. If the LRS is submitting the email, the permit holder must be included (CC’d) in the email.

Transfers within the University or from the University to other Facilities

- If you already have a green sheet for the item, please email radsafety@umanitoba.ca (cc the recipients) indicating the isotope, EHS serial number from the gold sheet and
 - If transferring within the University, indicate the recipient permit holder name & permit number. Once you receive an email to approve the transfer, the green sheet (keep a copy on white indicating when the item was transferred) and radioactive material may be transferred to the recipient permit holder.
 - If transferring to an outside facility, email to request RSO pre-approval and include the facilities name and the recipient’s name.
 - The University Radiation Safety Officer (RSO) must contact the RSO at the other facility prior to the transfer.
 - Then the green sheet is returned to EHS (keep a copy on white) and EHS must be involved with shipping the radioactive material to the other facility. 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.

Radioactive material is potentially dangerous and its transportation is controlled by Federal regulations, therefore there are stringent reporting requirements.

Transportation of Dangerous Goods Regulations

- Immediately report any anomalies (damage, tampering, wrong activity, radioisotope or shipment) to the Permit Holder and/or LRS and to Radiation Safety.
- The Radiation Safety Officer (RSO) must make a preliminary verbal report to the Canadian Nuclear Safety Commission and Manitoba Department of Environment. The consignor or vendor, must be informed immediately as well. Radiation Safety will do the reporting (see shaded text box below for contact information).

At any point you have to **STOP & report**

Contact Radiation Safety IMMEDIATELY (204) 474-6633

After normal business hours Radiation Safety may be accessed by contacting Security Services (204) 474-9340

STOP and report if:

- Shipment not received when expected
- Did not receive what you ordered or not your shipment
- Any sign of damage or tampering to the exterior or interior packaging

How do I receive (and open) a package of Radioactive Material or a Radiation Device?

Receiving Radioactive Shipments

- Packages of Radioactive Material shall never be left insecure.



- All shipments of radioactive materials labelled with one of the Transport of Dangerous Goods (TDG) symbols are only to be received and opened by persons that have been certified (trained) in receiving Class 7 Radioactive Materials.
- Non-certified personnel may only receive packages of radioactive materials that are shipped and labelled as “Excepted Packages” (no TDG symbols).
- Upon receipt, unopened packages of radioactive material should be promptly delivered to the recipient. Place package on a cart to increase the distance between people and the package in order to minimize radiation exposure.

**RADIOACTIVE MATERIAL,
EXCEPTED PACKAGE –
LIMITED QUANTITY OF MATERIAL
UN 2911**

Opening Radioactive Shipments

Unpack urgently as the package contains a dangerous good and may have been damaged during transport. You should also ensure you received what you ordered and once opened, the item must be secured in the storage location.

1. Verify the packing slip on the exterior corresponds with your order. If not your order **STOP & report.**
2. Check the exterior and then the interior of the package for possible damage or tampering. If the package is damaged or tampering is obvious **STOP & report.**

- a. To limit the spread of any contamination, isolate the package.
 - b. Follow the directions in the shaded box above.
3. If no visible damage or tampering, write the serial number from the green sheet on the sealed source, or on the container or tag. The serial number is located in the upper part of the green sheet.

The image shows a 'SHIPPER'S DECLARATION FOR DANGEROUS GOODS' form. It includes sections for:

- Shipper information (Name, Address, Phone, Fax, Email, Website, Page of Pages, Report Reference Number, Contact).
- Emergency contact information (Name, Phone, Fax, Email, Website).
- Shipping information (Date of Shipment, Mode of Transport, Origin, Destination, Country of Origin, Country of Destination, UN Number, Proper Shipping Name, Hazard Class, Packing Group, Net Weight, Net Volume, Gross Weight, Gross Volume, Container Type, Container Code, Container Size, Container Material, Container Condition, Container Seal, Container Markings, Container Identification, Container Description, Container Location, Container Status, Container Remarks).
- A table for 'Hazardous Goods Identification' with columns for UN Number, Proper Shipping Name, Hazard Class, Packing Group, Net Weight, Net Volume, Gross Weight, Gross Volume, Container Type, Container Code, Container Size, Container Material, Container Condition, Container Seal, Container Markings, Container Identification, Container Description, Container Location, Container Status, Container Remarks.
- Additional information (Remarks, Date of Declaration, Signature, Title, Position, Company Name, Address, City, Province, Country, Postal Code, Telephone, Fax, Email, Website).

- a. Record the pertinent information on the Radioactive Source Inventory Log Form (activity received, assay date and the device or source serial number).
- b. Forward the serial number, activity with date and if there is a leak test certificate to EHS. File a copy of the leak test certificate behind the correct tab in the Radiation Safety Records binder.
- c. Attach the shipping document (found on the outside of the package, sample on left) to the green sheet. The shipping document contains required information related to the dangerous good. TDG regulations require all copies be kept (effective November 2012).
- d. Remove or deface all radiation warning symbols and/or wording before discarding into the regular garbage.

Inventory Control



After receiving, what else is recorded in the Radioactive Source Inventory Log Form (green sheet)?

Record Log

Use the Radioactive Source Isotope Inventory Form to log when the source or device is used, or, if use is logged elsewhere (calendar, computer program) where use records are kept. Record when leak tests were performed and any security or inventory checks. The required information for each use

- Full date
- Name of the user
- Procedure (transfer, security check, leak test)

When the source or device is no longer needed

- Return the source or device to EHS with the original Radioactive Source Inventory Log Form (green sheet) and attached shipping document. The centralized inventory will be updated.
- Keep a copy of the 'green sheet' on white paper in the records binder for 8 years.

How does the University keep the centralized inventory up to date?

There is a process in place for Annual Reconciliation of the Radioactive Sources and Radiation Devices.

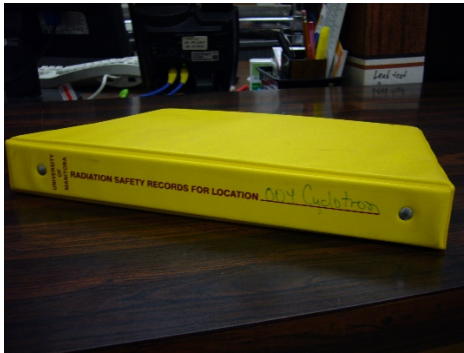
Why? To verify the radioisotope inventory registered to each permit as of December 31.

How?

- Early in January, EHS mails to the Permit Holder or LRS (if applicable) a RADIOACTIVE SOURCE or RADIATION DEVICE RECONCILIATION REPORT (a database printout) of the Permit Holder's registered inventory.
- The presence of sealed sources and devices must be physically verified and recorded on the printout of the inventory (and the green sheet).
- The RECONCILIATION REPORT sheet(s) must be sent back to EHS and any discrepancies must be reported on the sheet.



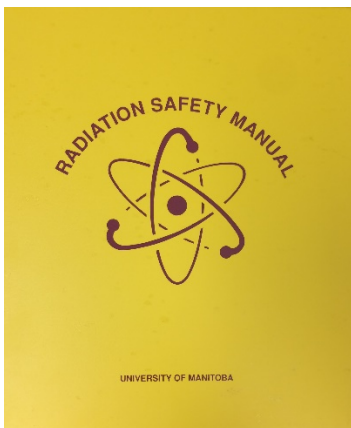
What records are required to demonstrate compliance?



- 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.
 - Sealed Source and Radiation Devices must be physically verified at least annually and the process documented in on the corresponding green sheet.
 - Keep Leak Test sample and test Certificates chronologically
 - Radioactive Source Inventory log Forms (green sheets) may be kept in the order most useful for the lab. Copies of green sheets on white paper should be kept (paper clipped or stapled to the related leak/sample certificates) together behind the inventory Quick Step divider to facilitate the discard of these records 8 years after the source or device is removed from the permit.

- Be sure the room and building are clearly labelled on the spine.

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:
 - Leak test procedures.
 - Safe Work Procedures 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!

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.

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 part in the orientation, refresher and site specific training and apply training to work practices
- 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

Refer to the Radiation Safety Manual, 2017 RSP-4 and the Quick Step Guides in the Radiation Safety Records Binders for a complete checklist of requirements.
