

Standard Operating Procedure

Handling of Radioactive Material at

PERFORM

PC-SOP-IM-005-v03

Revision History

Version	Reason for Revision	Date
01	New SOP	August/21/2013
02	Review and update	February/12/2015
03	Minor updates Lab 2.234 no longer designated, only exemption quantities permitted Added hyperlinks to forms in the appendix	March/23/2018

Summary

The content of this standard operating procedure (SOP) is to maintain compliance with safe practices of acquiring, using and disposing of radioactive substances at PERFORM.

Table of Contents

Summary	1
1. Definition of Terms and Abbreviations	3
2. Introduction.....	4
2.1. Background.....	4
2.2. Purpose.....	4
2.3. Scope.....	4
2.4. Responsibility.....	4
2.5. Relevant Documents.....	4
3. Procedure	5
3.1. Acquisition of Radioactive Materials	5
3.2. Use of Unsealed Radioactive Materials	5
3.3. Disposal of Radioactive Waste.....	6
3.4. Biohazardous Waste Disposal	6
3.5. Spill Procedures.....	7
APPENDIX I: Radioactive Material Inventory Log Sheet	
APPENDIX II: Waste Container Request Form	
APPENDIX III: Incident Report Form	
APPENDIX IV: SOP Training Record Form	

I. Definition of Terms and Abbreviations

ALARA	As Low As Reasonably Achievable
CNSC	Canadian Nuclear Safety Commission
EHS	Concordia University Environmental Health and Safety
Exemption Quantity (EQ)	The Exemption Quantity is the amount of activity for a given radionuclide below which it can be manipulated/transported without special procedures. Refer to CNSC's Nuclear Substances and Radiation Devices Regulations (SOR/2000-207)
Geiger Muller	A Geiger Muller counter, is a type of radiation detector that measures ionizing radiation
Hot Lab	A room for working with high-activity (as defined by current regulations) radioactive materials
NMIS	Nuclear Medicine Information System (Hot Lab computer)
Principal Investigator (PI)	Head researcher that is responsible for all aspects of a given research project or program at PERFORM.
Radioisotope	Any of one or several species of the same chemical element with different masses whose nuclei are unstable and dissipate excess energy by spontaneously emitting
Radiation Safety Officer (RSO)	Radiation Safety Officer, responsible for the safe use of radiation and radioactive materials as well as regulatory compliance.
RSO-CL	Radiation Safety Officer responsible for the Consolidated Uses of Nuclear Substances License.
RSO-NM	Radiation Safety Officer responsible for the Human Research Studies License.
Standard Operating Procedure (SOP)	SOP's at PERFORM are any operating document that require a full review process and approval by the SD.
Thermoluminescent Dosimeter (TLD)	A thermoluminescent dosimeter, is a type of radiation exposure measurement device. A TLD measures ionizing radiation exposure by measuring the amount of visible light emitted from a crystal in the detector when the crystal is heated

PERFORM Centre

User	Person using space or equipment at the PERFORM Centre that has received adequate technical and safety training.
Wipe Testing	A procedure through which one assesses contamination of a physical surface by radioactive material

2. Introduction

2.1. Background

Specific rules and regulations must be adhered to for acquiring, using and disposing of radioactive materials at PERFORM.

2.2. Purpose

The objective of the current SOP is to outline the minimum requirements and general rules for acquiring, using and disposing of radioactive materials at PERFORM.

2.3. Scope

This SOP applies to all users working with radioactive materials at PERFORM.

2.4. Responsibility

All users are responsible for;

- 2.4.1. Following all applicable safety rules and practices. All radiation exposures to members of staff, researchers, research participants, students, and visitors must be kept as low as reasonably achievable (ALARA).
- 2.4.2. Reporting all potential hazards, unsafe conditions or safety issues to Nuclear Medicine Supervisor/RSO or designate.
- 2.4.3. Attending all training courses as directed by EHS and the Nuclear Medicine Supervisor/RSO at PERFORM.

2.5. Relevant Documents

- PC-SOP-GA-002 Handling of Biological Materials at PERFORM
- VPS-47 Policy for the Management of Hazardous Materials
- VPS-40 Environmental Health and Safety Policy
- VPS-46 Radiation Safety Policy
- VPS-48 Hazardous Material Spill Response Policy
- Concordia University Radiation Safety Manual

Note: This SOP defers to Concordia policies at all times

PERFORM Centre

3. Procedure

3.1. Acquisition of Radioactive Materials

- 3.1.1. Refer to section 10 of the Concordia University Radiation safety manual.
- 3.1.2. Purchase of radioactive materials requires prior approval of the RSO-NM.
- 3.1.3. Prior to ordering radioactive materials, it needs to be verified, by the RSO-NM, that the amount to be purchased is within the possession limits specified by the CNSC License granted to PERFORM or below exemption quantities.
- 3.1.4. Delivery of radioactive material shipment must only be done via the loading dock (PC01.391.1). Acceptance of package must be done by someone who is TDG7 certified.
- 3.1.5. If the package is opened, damaged or leaking, the package should not be accepted, the shipper should not leave the premises and inform the RSO-NM immediately.
- 3.1.6. If a package is leaking or broken the RSO-NM will inform the vendor.
- 3.1.7. Upon receiving radioactive material shipment the package must be checked for leaks either by survey meter or wipe testing on all 6 sides.
- 3.1.8. Transfer of radioactive materials must be done via the freight elevator and the closest corridors. The person receiving and transporting the shipment must exclude other passengers. If passengers try to get on the elevator, the transporter must advise them that they are carrying a radioactive package and no one else is allowed in the elevator. RSO-NM should be immediately notified via e-mail upon reception of any shipment.
- 3.1.9. Any other internal transport will use specially designed containers marked with radioactive labels.
- 3.1.10. Storage of radioactive material is restricted to the rooms PCS1.139 (Hot Lab) and 1.241 (Radioactive Waste Storage Room).
- 3.1.11. Once the radioactive material is properly stored, a new radioactive material inventory log sheet will be created (Appendix I) for products used in the Clinical Analysis suite and the packing slip will be stored with the inventory sheet in the radioisotope log book.

3.2. Use of Unsealed Radioactive Materials

- 3.2.1. Refer to section 11 of the Concordia University Radiation safety manual.
- 3.2.2. It is the responsibility of all users to handle radioactive materials in a safe manner in order to protect themselves and those around them. Use appropriate lab coats, gloves, body TLD, ring dosimeters, and leaded apron.

PERFORM Centre

- 3.2.3. All amount of radioactive material used, stored, and or discarded to waste must be logged into the appropriate inventory system which is the radioactive material inventory log sheet (Appendix I) or NMIS for imaging.
- 3.2.4. It is the responsibility of the Nuclear Medicine Supervisor to provide the appropriate radioactive waste containers (Appendix II).
- 3.2.5. All liquid waste will be discarded into labeled containers with an absorbent gel. Each liquid-waste container shall be specifically used for one radioisotope only. All liquid waste will be stored behind the appropriate shielding for that particular isotope.
- 3.2.6. All solid waste will be deposited in labeled containers specified for that radioisotope which will be shielded appropriately for that particular radioisotope.
- 3.2.7. When a procedure involving radioactive material is complete, a survey for contamination either by Geiger Muller or by wipe testing will be performed. (Contamination Monitoring section, chapter 15, Concordia University Radiation Safety Manual).

3.3. Disposal of Radioactive Waste

- 3.3.1. Users are responsible for disposal of radioactive waste as described in (Radioactive Waste Disposal Procedures, chapter 17, Concordia University Radiation Safety Manual).
- 3.3.2. Only radioactive materials and potentially contaminated items are thrown into the radioactive waste container. Items which are not radioactive may be disposed of in chemical or regular waste.
- 3.3.3. When a waste container is full, a radioactive waste disposal tag must be completed and attached to the waste container. The RSO-NM must be contacted to verify that all the documentation regarding all waste container contents are in order before moving it to the radioactive waste storage room area (PCSI.241). Stored waste containers must use the appropriate shielding for decay or remain in storage room (PCSI.241).
- 3.3.4. PERFORM standard practice is to let radioactive substances decay below EQ whenever possible, until they can be transferred to the municipal garbage or treated as hazardous waste. Levels must be below one (1) EQ/kg before release, with maximum limits described for each isotope in the radiation license.
- 3.3.5. For transfer of radioactive waste off-site by a disposal service, the RSO-NM will get written approval from the RSO-CL and then fill out a waste transfer sheet to complete the chain of custody.

3.4. Biohazardous Waste Disposal

PERFORM Centre

- 3.4.1. Biohazardous solid waste (contaminated sharps, needles, syringes, etc. is disposed of in specially designated biohazard waste containers. When a solid waste container is almost full and ready to be picked up the end-user will advise the Nuclear Medicine Supervisor or the delegate and get a replacement. The end-user must give 24hours' notice to the Nuclear Medicine Supervisor or delegate to provide a new container from EHS or from Central Stores.
- 3.4.2. The Nuclear Medicine Supervisor or the delegate will request the removal of the full container by completing the form available on the EHS website and contacting EHS at hazardouswaste@concordia.ca, (PC-SOP-GA-002).

3.5. Spill Procedures

Training for handling a minor spill will be provided to all users (Appendix X of Concordia University Radiation Safety Manual, or the emergency information posted in each laboratory).

- 3.5.1. All spills involving more than one (1) EQ of radioactive materials must immediately involve the RSO-NM, RSO-CL and EHS.
- 3.5.2. If possible, attempt to minimize the spread of the spill, then phone security (3717) to indicate the nature of the emergency, its location, and if there are any injuries. When the spill is contained, the RSO-NM and the user will file a major spill incident report with EHS.

The following actions must be taken if the spill is under one (1) EQ

- 3.5.3. Verify that you or others have not been injured. If injury has occurred get help immediately.
- 3.5.4. Assess the danger and evacuate the lab or room if required.
- 3.5.5. Assess whether you have been contaminated by checking your lab coat, shoes and gloves. If any of these items are contaminated, leave them within the contaminated room.
- 3.5.6. Contact the RSO-NM for help in getting the spill under control. If it is unsafe to leave the area have a co-worker inform the RSO-NM.
- 3.5.7. PERFORM Center has radioactive spill kits for containing spills. Use the appropriate materials to contain the spill.
- 3.5.8. The RSO-NM and the user will fill out an incident report with EHS.

APPENDIX I
Radioactive Material Inventory Log Sheet
[Radioisotope Inventory Form](#)



PERFORM Centre

APPENDIX II
Waste Container Request Form
[EHS Waste Disposal Request Form](#)



PERFORM Centre

APPENDIX III

Incident Report Form

<http://www.concordia.ca/campus-life/safety/injury.html>



PERFORM Centre

APPENDIX IV SOP Training Record Form

SOP Title

Handling of Radioactive Material at PERFORM

SOP Code

Ownership	Document type	Area	SOP Number	Version
PC	SOP	IM	005	V03

Training Record

Full Name	
Institution/PI	
Contact (email or phone number)	

Signature

Sign here and return to SOP custodian

Date