RADIATION SAFETY PROGRAM

CONTENTS

UNIVERSITY OF WATERLOO

1.0 INTRODUCTION

Radioactive materials are used for research at the University of Waterloo. As such, the University has developed this Radiation Safety Program using the concept of ALARA as its guiding principle.

ALARA is a concept that seeks to keep all doses of radiation As Low As Reasonably Achievable based on social and economic factors. No practice involving exposure to ionizing radiation may take place if there is no benefit from that practice. Regardless of the practice, radiation exposures must be kept below federal exposure guidelines.

Refer to the Radiation Protection Manual for more information on ALARA.

2.0 PURPOSE

The purpose of this document is to:

- Protect workers, the general public, and the environment by ensuring that radiation doses are kept as low as reasonably achievable
- To ensure that regulatory and license requirements are met
- To describe the roles and responsibilities of personnel under the radiation protection program
- To ensure that proper training and instruction are delivered to workers

3.0 SCOPE

These guidelines apply to all radioisotope work conducted under the University of Waterloo including work carried out by researchers, instructors, students, workers, and other individuals.

4.0 LEGISLATION

- NCSA
- General Nuclear Safety and Control Regulations
- Nuclear Security Regulations
- Nuclear Substances and Radiation Devices Regulations
- Packaging and Transport of Nuclear Substances Regulations
- Radiation Protection Regulations

5.0 ROLES AND RESPONSIBILITIES

5.1 APPLICANT AUTHORITY

At the University of Waterloo, the applicant authority is the Director of Safety. Their role includes the following duties:

- Overseeing the Radiation Safety Program at the University of Waterloo.
- Apply for licenses when materials require them.
- Appoint at least one Radiation Safety Officers (RSO's) to service the University of Waterloo.
- Report the status of radiation safety issues to the Senior Management Safety Committee.
- Ensure unresolved non-compliance issues are resolved promptly.
- Provide resources to researchers and workers to ensure they are working in a compliant manner.

5.2 PERMIT HOLDERS (PRINCIPAL INVESTIGATORS)

The primary responsibility for the safety of staff, students and the public lies with the permit holder in charge of the research or teaching that involves the use of radioactive materials. Permit holders must be familiar with, follow, and ensure that all individuals working within their laboratories comply with procedures outlined in this Radiation Safety Program. In particular, principal investigators and instructors shall:

- Obtain a Radiation-Safety Permit when using radioactive material
- Provide adequate supervision so that all work is completed following procedures set out by the UW Radiation Safety Committee and the Canadian Nuclear Safety Commission (CNSC).
- Keep an up-to-date inventory of all radioactive materials, including storage and disposal records in the laboratory.
- Train all workers, students, interns, and other individuals handling radioactive materials on the risks, how to control them at the University, and in your specific lab.
- Maintain area monitoring and/or wipe test records for inspection by the RSO.
- Require all personnel under their supervision wear the appropriate radiation dosimetry equipment and participate in any prescribed bioassay program.
- Immediately contact and notify the RSO should they become aware of the reportable activity.
- Develop written standard operating procedures (SOPs) and provide them to workers under their supervision as required by the RSO and/or the permit application process

5.3 WORKERS/STUDENTS

Workers/students handling potentially radioactive materials are required to:

- Undergo any training as required by their direct supervisor and the University.

- Follow procedures developed for a specific laboratory or project and the overall University and CNSC processes for the handling of radioactive materials.
- Wear personal protective equipment as prescribed.
- Immediately inform the Principal Investigator (PI) if:
    - You suffer an exposure or believe you have been exposed to a radioactive agent.
    - There is a spill of radioactive material.
- Immediately inform the Principal Investigator if you are aware of a “Reportable Activity” occurring.
- Wear personal dosimeters, as required.

5.4 RADIATION SAFETY OFFICER (RSO)

The Radiation Safety Officer is required to have both theoretical and practical experience. A Curriculum Vitae is submitted to the CNSC for anyone designated as a Radiation Safety Officer at the University of Waterloo.

5.4.1 DUTIES OF THE RADIATION SAFETY OFFICER (RSO) WITH RESPECT TO THE UNIVERSITY

- Act as the agent of the institution in respect to licensing matters.
- Be available to the licensee effectively on a full-time basis.
- Establish, implement, and maintain a safety control and assessment program in conjunction with the UW Radiation Safety Committee.
- On a semester basis, review survey programs for radiation and contamination levels in all areas where radioactive materials are used, stored, or disposed of.
- Implement a personnel-monitoring program including bioassay, if applicable.
- Calibrate and service radiation safety instruments as required.
- Conduct a quarterly review of occupational radiation exposures and recommend ways of reducing exposures in the interest of ALARA.
- Supervise decontamination procedures.
- Provide waste disposal procedures following conditions of the radioisotope license.
- Ensure leak testing of sealed sources.
- Control the purchasing, use, and disposal of radioactive materials through the issuance of internal permits.
- Ensure appropriate radiation protection training is provided regularly as part of an ongoing "radiation protection awareness program" for all users and those who are exposed to radioactive materials.
- Maintain required records.

- Amend each internal permit when necessitated by changes to facilities, equipment, policies, isotopes, procedures, or personnel.
- Coordinate the development of plans used in the case of an emergency involving radioactive materials.
- Investigate all overexposure, accidents, and losses of radioactive materials and report to the CNSC.
- Report any "Reportable Activity" in a timely fashion to the CNSC.

5.4.2 DUTIES OF THE RSO WITH RESPECT TO THE RADIATION SAFETY COMMITTEE

- Function as the link between the University Radiation Safety Committee and radioisotope users within the institution.
- Prepare or review in consultation with the UWaterloo Radiation Safety Committee a comprehensive Radiation Safety Program.
- Prepare in consultation with the Radiation Safety Committee, an Annual Report to the CNSC or as required
- Provide direction pertaining to:
  - Facility and equipment design
  - Work practices and procedures
  - Waste storage and disposal management
  - Evaluation, issuance, and enforcement of internal permits
  - Disciplinary action necessitated by noncompliance
  - Radiation safety training

5.5 RADIATION SAFETY COMMITTEE

The purpose of this committee is to provide oversight regarding activities involving radioactive materials. The committee will focus on the following:

- Review planned laboratory activities to ensure the completion of appropriate hazard identification and risk evaluation activities.
- Assess requirements and recommend revisions for laboratory users training and laboratory safety procedures.
- Review reports related to laboratory safety services, activities, incidents, and interventions in laboratory areas and recommend corrective actions.
- Report as required to the Vice-President of Research at the University of Waterloo.

6.0 WORKER DESIGNATION, QUALIFICATIONS AND EXPERIENCE

Only persons expected to receive a dose of more than 1.0 mSv per year whole body will be designated as Nuclear Energy Workers (NEW). Workers designated as a Nuclear

Energy Worker (NEW) must complete a Notification of Nuclear Energy Worker Status (PDF).

Workers performing general laboratory tasks as part of University research would not expect to receive a whole body dose of more than 1.0 mSv per year, and therefore, are not designated as Nuclear Energy Workers.

7.0 TRAINING

Researchers, workers, and students handling radioactive materials and isotopes are required to complete all the elements of the University's Radiation Safety Training Program.

The University of Waterloo has the following types of radiation training based on radiation type and risk.

Training Type	Description
Open Source	1. Complete the Working with Radiation – Open Source online Course 2. Attend a Radiation practical training with the Radiation Safety Officer 3. Be added to the appropriate radiation permit 4. Retraining is required every three years
Check Source and Antistatic Devices	1. Complete the Working with Radiation – Sealed Source online Course 2. Be added to the appropriate radiation permit 3. Retraining is required every three years
Sealed Sources	1. Complete the Working with Radiation – Sealed Source online Course 2. Attend a Radiation practical training with the Radiation Safety Officer 3. Be added to the appropriate radiation permit 4. Retraining is required every three years
Neutron Probes	1. Complete the Working with Radiation – Sealed Source online course 2. Complete Radiation TDG 3. Attend a Radiation practical training with the Radiation Safety Officer 4. Be added to the appropriate radiation permit 5. Retraining is required every three years
Exempt Permits	Permits with only non-regulated sources, particularly instrumentation, may be exempt from radiation specific training requirements. This will be determined at the discretion of the RSO and will be indicated on the permit poster.
Awareness Training	Applies to all service and custodial staff that work in Radioisotope laboratories. Training is completed in-person. Retraining is recommended every 3 years.

Any University of Waterloo worker or student with a valid UWaterloo user ID and password can access the online training. The material covered in this training module provides the worker/student with general radiation safety procedures.

The Principal Investigator (PI) or a competent designate provides the laboratory specific practical radiation safety training. It should encompass the specific procedures used in the laboratory for the handling, use, and disposal of radioactive material. It should also include training on emergency procedures, the use of the emergency equipment, and reporting protocols used in the laboratory.

It is the responsibility of the PI to track and document the training they provide to their workers and students.

Individuals working with radiation shall be re-trained every 3 years.

Note: when radiation is used in teaching labs, alternative training arrangements may be made for students in consultation with the RSO. Still, the course instructor and TA's must take any radiation training required by the radiation program.

8.0 PERMITS

A permit system maintains the control of radioactive materials at the University of Waterloo. The UW Radiation Safety Committee issues radiation Permits to all principal investigators/instructors handling radioisotopes. However, only those PI's who use radioactive materials above Exempt Quantities (EQ) are required to complete the permit application unless otherwise requested by the RSO. Those using materials below the EQ are issued permits to assist with the tracking of sources.

8.1 APPLYING FOR A PERMIT

To obtain a permit, follow the process outlined in Figure 1.

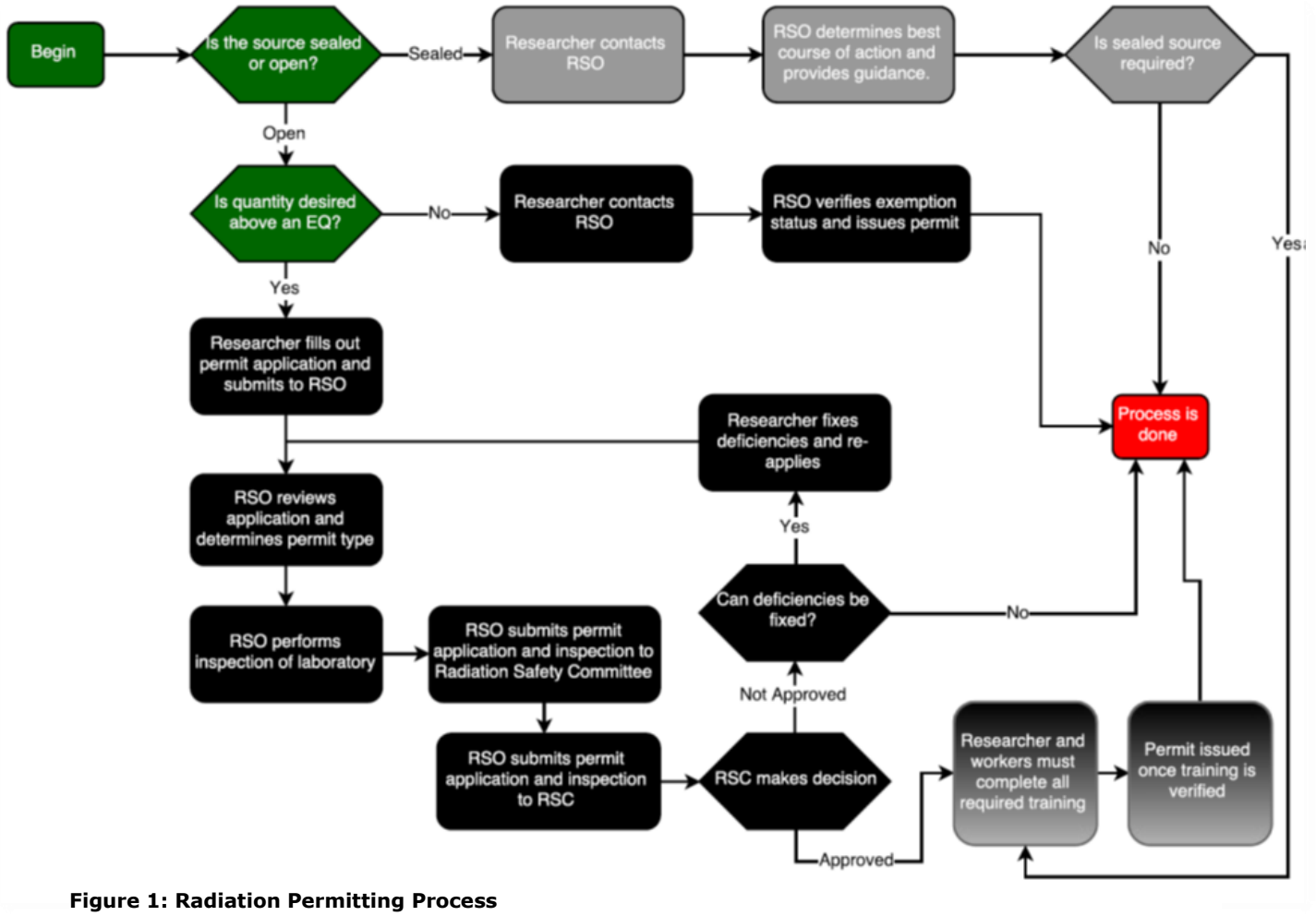

Figure 1: Radiation Permitting Process

- Green boxes indicate the start of a process.
- Black boxes correspond to open sources.
- Grey boxes correspond to sealed sources.
- Red boxes denote the end of the process.

Permits will not be issued until all training for all users has been completed and verified. The permit certifies the laboratory for work with the specific radioisotopes and amounts indicated. Working outside these limits is prohibited unless you amend your permit.

Whenever formal permit applications are required as per the process outlined in Figure 1, Safe Operating Procedures (SOP) should be submitted by the PI along with the permit application for review by the RSO. During the course of work, if a change occurs where the work varies from the original SOP, the SOP should be re-submitted to the RSO for approval.

8.2 TYPES OF PERMITS

The CNSC classification for laboratories using open sources consists of three designations: Basic, Intermediate, and High. The designations are based on the Annual Limit on Intake or (ALI). An Annual Limit on Intake is defined by the CNSC as the activity, in becquerel, of a radionuclide that will deliver an effective dose of 20 mSv during the 50-year period after the radionuclide is taken into the body of a person 18 years old or older or during the period beginning at intake and ending at age 70 after it is taken into the body of a person less than 18 years old. Table 1 lists the criteria for classification.

Table 1: CNSC classifications for laboratories using open-source radioactive materials

Room Classification	Description
Basic	The quantity of unsealed nuclear substance used at a single time does not exceed 5 times its corresponding annual limit on intake (ALI).
Intermediate	The quantity of unsealed nuclear substance used at a single time does not exceed 50 times its corresponding ALI.
High	The quantity of unsealed nuclear substance used at a single time does not exceed 500 times its corresponding ALI.

For sealed sources, classifications are different. The source itself is classified based on the activity and the potential hazard it could cause. Criteria outlined by the CNSC for determining the categories include:

- Radiological risk associated with the source
- Nature of the work (or application for which the source is used)
- Mobility of the source
- Experience from reported accidents
- Typical versus unique activities within an application

For a more detailed description, with examples, go here.

8.3 AMENDING OR DECOMMISSIONING A PERMIT

Follow the steps below to amend a permit. To decommission a permit, contact the RSO.

1. Make a list of the radioisotopes you wish to add to or remove from the permit.
2. If adding isotopes, identify what activity you would like to perform with each of the additional isotopes.
3. Contact the RSO and provide the isotopes and the activities to them.

9.0 LICENSED LOCATIONS

Radioactive materials can only be used or handled in permitted locations. Before use, notify all personnel expected to be in the area about the use of the material, and take precautions to ensure that the maximum allowable working field of 2.5 uSv/hr in any direction from the source is not exceeded.

9.1 WORKING PRACTICES

Before beginning work with radioactive materials, numerous work practices need to be prepared for.

9.1.1 LABELS AND POSTERS

Labels need to be affixed to numerous areas in laboratories that work with radioisotopes. Isotopes: must be labeled with isotope name, activity, and the user name.

Radioactive Storage Locations: must have a "Caution Radioactive Materials" sign. Storage locations include fridges and lockboxes.

Work Areas: must have a "Caution Radioactive Materials" sign. Work Areas include fume hoods, equipment, benchtop, or tray.

Remember, do not work around or near a sink. Post reminders in the area.

Finally, posters will be provided by the safety office which includes CNSC posters and the laboratory permit poster.

9.1.2 WORK AREAS

Proper work areas must be readily accessible before the purchase of radioisotopes. Contact the RSO before work to review the research plan. Contamination free plans include:

- Working on a tray with absorbent material rather than directly on the benchtop
- Working in a fume hood that is maintained yearly
- Working away from sinks
- Wipe testing freezers and fridges to test for contamination

9.1.3 CONTAMINATION CONTROL

After work, each area where radioactive work was performed should be evaluated for contamination. Two types of contamination are used depending on the type of radioactive work being completed:

1. Direct contamination reading
    - Direct reading involves the use of portable detectors or survey meters to detect high-energy beta emitters, x-rays, and gamma radiation. To use these meters, the user would position it 2 cm above the surface to be measured and then move the meter slowly overtop the area in a grid-like manner.
    - Low-energy beta radiation cannot penetrate the detector window and therefore cannot be detected using portable or survey meters.
2. Wipe testing

- Wipe testing involves moistening a disc of filter paper with ethanol, then rubbing it over a 10 x 10 cm area (100 cm2). Finally, count it in a liquid scintillation counter (or gamma-well counter).
- If a result indicates that contamination is greater than 3 Bq/cm^2 value., decontamination and successive wipe testing are required until levels are below the 3 Bq/cm^2 value.
- Wipe tests are required after all open source work unless use of a meter has been approved by the RSO.

Appendix B contains general equipment decontamination procedures.

9.1.4 PERSONAL PROTECTIVE EQUIPMENT

Radioactive work includes wearing appropriate personal protective equipment like gloves, laboratory coats, shoes, pants, and glasses, goggles or face shields.

- **Gloves:** Gloves are mandatory when working with radionuclides. They should be checked prior to and frequently during use for small holes or punctures. Disposable gloves are prone to fail and therefore best practice is to double glove. This provides added protection but also ensures that work does not need to be immediately interrupted should the outer pair become damaged. Gloves are prohibited from being worn outside the lab.
- **Laboratory Coats:** Help ensure the user's personal clothing is protected from spills and splashes. Coats should have cuffs rolled down and tucked within gloves. Gloves are prohibited from being worn outside the lab.
- **Eye Protection:** Projects involving work that agitates, mixes, sonicates, or spins liquid materials must be done while wearing eye protection. At a minimum, this means safety glasses with side shields are required. If splash potential is high, face shields should be used.
- **Clothing:**

  Follow these guidelines when working with radionuclides:

  - Remove jewelry, especially rings. If jewelry becomes contaminated, it may not be possible to adequately decontaminate it meaning it may not be able to be worn again.
  - Pants should be worn to provide splash protection on the lower limbs. Do not tuck pants into boots, as a spill will travel down the pant and into the boot
  - Wear closed-toe shoes

9.1.5 TIME DISTANCE SHIELDING

It is always best to minimize the potential for exposure by utilizing the principles of increasing the distance, decreasing the time, or using appropriate shielding. Review the Radiation Protection Manual for more information on these controls.

9.2 EMERGENCIES

Personnel using radioactive materials must be knowledgeable of all the policies, procedures, and processes that are to be followed should an incident or accident occur. Any situation, especially involving personal contamination, MUST be immediately reported to one of the RSO's on campus. During regular work hours, (8:30am to 4:30pm) RSO contact information is as follows:

Table 4: RSO contact information

Primary RSO:	Secondary RSO:
Katelyn Versteeg Phone: 37900 Email: radiation@uwaterloo.ca	Dhananjai Borwankar Phone: 36268 Email: radiation@uwaterloo.ca

If an incident occurs after hours, contact campus police at extension 22222 and they will contact whichever RSO is available. No work shall resume after an incident until one of the RSO's has indicated the site is permitted to continue work.

The three most likely emergencies when working with radioactive materials at the University of Waterloo are spills, a leaking sealed source, and contamination of personnel.

9.3 SPILLS

Preparing for spills will result in a much less severe outcome. Being prepared means knowing:

- The location of spill response equipment in the work area
- How to use the equipment
- How to communicate the spill

A radiation spills kit should include:

- Disposable nitrile gloves and foot covers
- Plastic bags for waste disposal
- Radiation tape and cleaning rags
- Absorbent materials (e.g, paper towel and absorbent pads)
- Organic solvent
- Wax pencil
- Warning signs and/or caution tape
- Contamination testing materials (e.g., monitoring devices and filter paper)

- Decontamination detergent (recommendations: Sparkleen, Fantastik, or Alconox)
- Gritty cleanser
- Waste labels
- Tongs and/or forceps
- Protective eyewear (safety glasses with side shields or a face shield)

Appendix A contains specific spill cleaning steps.

9.4 SEALED SOURCE LEAKS

The primary hazard from a broken or leaking sealed source is external gamma radiation. To reduce the risk of exposure, follow this procedure:

1. Evacuate the area and post signs.
2. Monitor and cordon off the “Hot Area”.
3. Monitor all personnel.
4. Notify your Supervisor, an RSO, and commence personnel decontamination procedures.
5. Use a remote handling device such as tongs and forceps to put the source into a shielded container.
6. Use spill clean-up procedures outlined in Appendix A to decontaminate the area.

9.5 PERSONNEL CONTAMINATION

Personnel contamination is either external or internal. External contamination is usually the result of a splash or spill on the individual. Internal contamination occurs when a source has been accidentally ingested or injected into an individual. Appendix B outlines the external decontamination procedures.

For individuals working with I-125, any personal contamination must be immediately reported to an RSO, either by their phone extensions as per Table 4, or through Special Constables at ext. 22222. Ensure that you talk to a person and do not leave a message or email. Personal contamination of I-125 requires thyroid screening to be completed on the contaminated individual within 24 hours. The individual will be sent to McMaster University for screening as coordinated by the RSO.

9.6 LOSSES OR THEFTS OF RADIOACTIVE MATERIALS

Losses or thefts of radioactive materials are treated very seriously by the Canadian Nuclear Safety Commission (CNSC) and requires immediate reporting to them. As soon as loss of theft has been discovered, it is imperative that one of the RSO’s are notified so they can contact the CNSC to file a report and begin the investigation.

10.0 APPENDIX A: SPILL PROCEDURES

General Precautions

1. Inform persons in the area that a spill has occurred. Keep them away from the contaminated area.
2. Cover the spill with absorbent material to prevent the spread of contamination.

Minor spills (less than 1 exempt quantities and non-volatile)

1. **Proceed if you feel comfortable in cleaning up the spill, if not, contact the RSO for help.**
2. Inform occupants of the room as to the nature and location of the spill.
3. Limit movement near the spill.
4. Put on 2 pairs of disposable gloves, lab coat and respiratory protection if the substance is volatile, or aerosol generation is suspected.
5. Mark the location of the spill with a wax pencil and begin approved decontamination procedures as soon as possible.
6. Place absorbent paper on spill if wet. DO NOT rub area – as moving towels around may spread contamination. Frequently dispose of used towels.
7. If spill is a powder, wet with water/organic solvent and place absorbent paper on wetted material.
8. To avoid spreading the contamination, work from the outside of the spill towards the center.
9. Do not track contaminants away from the spillage area.
10. Place contaminated absorbent paper in sealable container with appropriate shielding and label.
11. Following decontamination, check the area for any residual contamination. Repeat decontamination, if necessary, until contamination monitoring results meet the radioisotope license criteria.
12. If the spill cannot be cleaned-up, call a Radiation Safety Officer at ext. 33587 or contact UW Police ext. 22222.
13. Report the spill and cleanup to the supervisor and a Radiation Safety Officer at ext. 33587 within 24 hours.
14. Record spill details and the results of contamination monitoring. Adjust inventory records.

Major spills (more than 1 exempt quantities or volatile materials)

1. Clear the room. Persons not involved in the spill cleanup should be prevented entry.
2. Call a Radiation Safety Officer at ext.33587 (do not leave a voice mail message). If not in, contact UW Police at ext. 22222.
3. Limit the movement of all personnel who may be contaminated until they are monitored.
4. Leave the fume hood running to minimize the release of volatile radioactive materials into adjacent rooms and hallways.
5. Close off and secure the spill area to prevent entry. Post warning signs that indicate entry is prohibited.
6. If an individual has become contaminated, follow the decontamination procedures found below in Appendix 2.
7. Record names of all individuals involved or witnessing the spill. Note details of personal contamination.
8. Submit an incident report to the Radiation Safety Officer within 24 hours of the incident.

Table 4: List of exemption quantities

Radionuclide	Exemption quantity (mCi)	Exemption quantity (MBq)
C-14	0.27	10
H-3	27	1000
I-125	0.027	1

11.0 APPENDIX B: DECONTAMINATION PROCEDURES

Table 5: Decontamination procedures

External (Skin)	External (Orifices)
▪ Use mild soap and warm water. DO NOT use hot or cold water. Hot water opens pores and increases blood flow (increased absorption). Cold water may not be effective. ▪ Rub for 2 to 3 minutes. RUB DO NOT SCRUB – scrubbing may cause abrasions in skin (potentially causing internal contamination). Work from center of body outward ▪ If hands are contaminated, pay special attention to fingernails. ▪ Monitor body. Repeat washing if contamination is still present.	▪ Eyes – Rinse at an eyewash station for 15 minutes. ▪ Mouth – Rinse mouth with water but DO NOT SWALLOW. ▪ Nose – Blow nose and keep tissue for further monitoring. The nose filters can filter much of the particulate and aerosols that are inhaled. ▪ Ear – Tilt head and allow liquid to drain out on a tissue. Keep for monitoring.
Contaminated Wounds	**Contaminated Clothing**
▪ Remove gloves and turn inside out. Save item that cause the wound. Gloves and item will be used for contamination monitoring. ▪ Allow wound to bleed. Flush gently with water. ▪ Bandage and cover wound.	▪ Put on a clean pair of gloves. Carefully remove all contaminated clothing and turn inside out as you remove. ▪ This will help to prevent further spread of contamination. ▪ After removal, monitor all exposed skin areas. ▪ Bag contaminated clothing and provide to RSO for further action.

In all cases, contact the Radiation Safety Officer via the safety office through extension 33587. Do not leave a message. If there is no answer contact campus police at extension 22222.

12.0 APPENDIX C: REPORTABLE ACTIVITIES

General Precautions and Materials

1. Always wear PPE when attempting to perform decontamination operations. Minimum requirements are using double gloves, lab coat, and safety glasses with side shields or goggles.
2. Use disposable materials like paper towels or absorbent pads.
3. Decontamination Products include:
    1. 2 tablespoons of Alconox or Sparkleen can be dissolved in water to make a paste.
    2. Fantastik can also be effective.
4. Methods recommended are washing, scrubbing, and abrasion. Always progress from the least aggressive to the most aggressive. Note: scrubbing and abrasion are not recommended for personnel exposure. Any grinding, sanding, scraping or chipping methods shall not be used as they may cause contamination to become airborne. If you think these may be your only options, contact and consult with the RSO before beginning.

Procedures

1. Complex items (lots of crevices and cracks) should be disassembled prior to decontamination – do not disassemble the item if item integrity is lost (contact RSO for guidance).
2. Scan surface of the item to determine the area of highest contamination.
3. Start at the edge and work your way inwards OR start at the area with the highest contamination readings. Change towels frequently so contamination is not spread along the surface of the item (i.e., make only one to two passes before discarding towels).
4. Dispose of towels in pail lined with a plastic bag.
5. Frequently monitor surfaces after conducting wipes.
6. Conduct swipe tests to ensure there is no removable contamination.
7. Items that cannot be decontaminated must be labeled as a radioactive item, and treated as such.

Once procedures are complete, remove gloves, wash hands and monitor yourself for contamination. If you or your clothing are contaminated, use the personal decontamination instructions in Appendix B.

13.0 RECORD OF REVISIONS

Date	Author/Editor	Change	Version
January 2023	Katelyn Versteeg	• Section 7.0 New training introduced • Section 9.2 Table 4 Updated to RSO of Katelyn Versteeg and Dhananjai Borwankar • Section 9.5 Thryoid Screening for 1-25 personnel contamination added • Appendix A – irrelevant exemption quantities removed	Radiation Safety Program V.4.0 JAN2023
January 2022	Katelyn Versteeg	• Section 4 Added links to legislation • Section 7.0 New links in training added details on laboratory training • Section 8.0 addition of SOPs for permit application requiring permits • Section 9.1 Work practices condensed • Removal of Section 9.1.5 Time Distance Shielding and Appendix E and moved to resource document Radiation Protection Manual. • Appendix B minor reformatting • Appendix D Contamination Forms removed and moved to Website	Radiation Safety Program V.3.0 JAN2022
September 2020	Greg Friday	• Added an "Introduction" section that introduces ALARA • Added an ALARA Appendix	Radiation Safety Program v.2.0 SEP2020
September 2019	Dhananjai Borwankar and Greg Friday	• Training moved to LEARN • Added section 12.0 Record of Revisions	Radiation Safety Program v.1.0 SEP2019
September 2018	Dhananjai Borwankar and Greg Friday	• Formatting changes	Radiation Safety Program v.1.0 SEP2018