







Safe Work Procedure:
Radioactive material spill (all except C-14)

SCOPE	
This document defines the Safe Work Procedure for managing a spill of radioactive material.	
Application	
To minimise the risk of contamination and spread of radioactive material in the event of a spill.	
SAFETY HAZARDS AND RISK CONTROLS	
Hazard	Control Strategy
1. Exposure to radiation	Minimise personnel in proximity to spill Follow SWP to minimise length of time in proximity Wear all PPE required as below
2. Inhalation of radioactive material	Wear respiratory protection. Spill to be weighed down/covered with moist towelling or spill pads as soon as reasonable to prevent airborne particles and prevent accidental spread of contamination
3. Loss of radioactive material	Radioactive material and items used to clean spill, to be disposed of into a radiation spill bag for appropriate disposal Register to be updated post-spill to reflect any changes
<i>Employ all methods/steps as described in this SWP</i>	
Personal Protective Equipment (PPE)	
Appropriate personal protective equipment must be provided and used. PPE must be appropriately selected, individually fitted and workers trained in correct use and maintenance:	
	Safety Glasses Safety glasses or goggles must be worn at all times.
	Respiratory Protection P2 respiratory protection to be worn
	Protective Gloves Disposable gloves must be worn at all times when managing a radiation spill.
	Protective Clothing Disposable full-length dust coveralls must be worn.
	Footwear Enclosed footwear with protective booties must be worn at all times.
	Hair Long and loose hair must be contained.
ROLES AND RESPONSIBILITIES	
Title	Role
1. Researchers/, lab technician, Rad. Safety Supervisor	Evacuate non-essential persons from vicinity of spill, without spreading spill. Prevent further access to the spill site. Follow procedure outlined in SWP, manage any injuries. Notify Radiation Safety Supervisor, University Radiation Safety Officer (RSO) and first aider as required.

PROCEDURE

Initial Spill

1. **Alert others** in vicinity of spill.
2. **Assess** the extent of the spill, any injuries.
3. **PPE** - Put on additional PPE if required.
4. **Isolate** - restrict access to room/area to prevent spread or further contamination.
5. **Move away** – unless injury prevents, all persons to move a minimum of 3m away from the spill via a defined pathway of blue absorbers, until they are able to be assessed for contamination.
6. **Seek** assistance - contact RSS, RSO, first aid (if needed), technical staff (if needed), retrieve radiation monitor.
7. **First Aid** - treat any injuries (remove injured person from spill where possible). Refer to *First Aid & Personal Decontamination*
8. **Assess and identify contamination:**
 - a. Personnel, paying close attention to hands, feet etc
 - b. Spill boundaries (use marker to outline)
9. **Evacuate** all non-contaminated people by a defined path.
10. **Decontaminate** - any contaminated or potentially contaminated people to move away from spill site (without spreading spill) and begin decontamination procedures. Personal decontamination takes precedence over laboratory decontamination. Refer to *First Aid & Personal Decontamination* and *Laboratory Decontamination*.
11. **Recovery** – replenish spill kit, complete incident report, dispose of waste & undertake biological monitoring/medical assessment as appropriate. Refer to *Post Incident*

First Aid & Decontamination of Personnel

Nearest First Aid Kit is located in the corridor outside the workshop or in the sample prep lab. Send non-contaminated person to retrieve it.

Remove any potentially contaminated gloves (turn inside out and put in plastic bag label with the name & phone number of the wearer, the isotope/s involved and the date). Replace with new gloves before commencing any of the following procedures.

Procedures should be continued until monitoring shows that contamination has reduced to an acceptable level, unless there is a risk of contamination entering the bloodstream through roughening or breaking of the skin.

Major Injury

Treat injury first as per standard first aid. Advise any external first aid/medical personnel of person and area radiation contamination.

Contaminated Clothing

Put on clean gloves, remove contaminated clothing/footwear. Remove clothing inside out to prevent spread of contamination. Put clothing into a sealed plastic bag and label with the name & phone number of the owner of the clothing, the isotope involved and the date.

Radioactive Material in Eyes

Irrigate with saline eyewash for a minimum of 15 minutes (use water if saline is unavailable). Ensure saline (and any contaminants) are not swallowed.

Radioactive Material in Mouth

Rinse mouth with water. Repeat several times. Wash out mouth with hydroperoxide solution (1tbsp of 10 volume hydroperoxide solution per 300ml water). Repeat several times. Do not swallow.

Radioactive Material in Nose

Blow your nose. Put the tissue in a sealed plastic bag to be analysed for radioactive contamination. Label bag with name & phone number of the person involved, along with the isotopes involved and the date.

Radioactive Material on Skin

Wash with soap and water, **taking care not to break skin**. Wash outward towards extremities to prevent spreading contamination. Pay attention to creases in skin, and under/around fingernails if contamination is on hands. Dry well with paper towel, and monitor skin. Repeat if necessary.

Contaminated Wound (Small)

Flush wound with warm water (minimum 5 minutes) and encourage bleeding. Dry and monitor. Treat injury as per standard first aid.

All possible attempts should be made to immediately estimate the radiation dose received to provide guidance on the need for subsequent medical attention. In the event of a radiation incident, consideration should be given to providing support services to the staff involved and family members to reduce stress.

Dispose of all rubbish as per radiation rubbish.

Laboratory Decontamination

The decontamination of personnel should always take precedence. If there is no personal contamination proceed to clean up the spill.

12. Put on heavy duty impermeable gloves and protective clothing (a laboratory coat or Tyvek coveralls, safety glasses, booties and respirator)
13. Use a radioactive monitoring device to determine the exact location/s of the contamination and mark it with marking pens or by other means
14. **Liquid:**
Soak up radioactive liquid with paper towels or absorbent pads. Use forceps to transfer waste to a plastic bag/ziploc for disposal in radiation waste bag. Replace with dry absorbers until all liquid is mopped up.
15. **Solid:** Cover spill with damp absorbent towels to suppress sand/dust. Carefully wipe up spill, working from outside in towards centre of spill.
16. When all radioactive material is removed, working from the outside in, scrub with wetted towel (10% Decon 90 or equivalent detergent) and dry as before.
17. Keep contaminated paper towels etc. in a disposable plastic bag
18. Check the washed area with a contamination meter and repeat the washing if still contaminated.
19. Place all waste in plastic bags (seal and label).
20. Wash and monitor your hands and clothing before leaving the area.

Post-Incident

1. Any/all contaminated paper towelling, HEPA filters etc. to be placed in a plastic marked hazardous waste rubbish bag and sealed.
2. Estimate doses received by persons involved
3. Ensure local RSS and University RSO have been informed.
4. RSS/RSO to ensure that the spill kits are replenished or designate an appropriate person to do so.
5. All waste should be clearly labelled with name/date/radioisotope/activity, bagged and transferred to the appropriate radiation waste buckets or repository.
6. Medical assessment/ biological monitoring as required– contact RSO for advice based on dosage/isotopes involved.
7. Update internal & government registers, as appropriate
8. Complete an incident report form

REFERENCE MATERIAL AND ATTACHMENTS

1. http://www.csu.edu.au/acad_sec/committees/radiation/docs/RSC_Manual.pdf
2. <http://www.safety.uwa.edu.au/incidents-injuries-emergency/procedures/lab#radioactive>
3. <https://www.ucalgary.ca/safety/system/files/radioactivespillsanddeconprocedures.pdf>
4. https://www.sydney.edu.au/science/molecular_bioscience/ohs/documents/sop/SOP_SMB_056_2_Working_with_Carbonzzzz_14_radioactive_isotopes_LB%20NC_0315.pdf
5. <https://www.lsuhs.edu/admin/pfm/ehs/docs/EHS100.04%20-%20Radiation%20Spill%20Response%20Procedure.pdf>

Authorisation

Approved for use by:

MANAGER/SUPERVISOR NAME:

SIGNATURE:

DATE: