



RADIATION EMERGENCY PROCEDURES

In the event of an accident (spill, ingestion, over-exposure, etc.), the PI shall notify the Radiation Safety Office (RSO) as soon as possible without permitting excessive spreading of contamination or exposure. In the absence of the RSO, contact any Radiation Safety Committee Member.

SPILLS (refer below and to flowchart attached)

- Spill kits shall include a copy of the spill response flowchart.
- When possibility of spills of radioactive material exists, secondary containers or trays should be used.
- Containers should be covered whenever possible and only amounts of radioactive material that is immediately necessary should be taken from the stock.
- In the event of accidental spillage, keep calm, use common sense, protect people, and avoid spreading the contamination.
- If high radiation levels or possibility of airborne contamination from **volatile** radioactive material exist, evacuate the laboratory immediately; secure the laboratory to prevent entry; notify RSO; unnecessary movement or touching shall be avoided.

MINOR SPILLS

The investigator shall:

1. Notify other personnel in the area so they are aware of the spill.
2. Permit only a minimum number of people necessary to deal with the spill to be in the area of contamination.
3. Get supplies ready. Fresh new gloves should be worn to protect hands and avoid spread of contamination; change gloves frequently.
4. Confine the spill immediately by:
 - a. Mark the area of the spill with tape.
 - b. Liquid Spills: While wearing rubber gloves, gently place absorbent material on the spill
 - c. Dry Spills: While wearing rubber gloves, dampen to prevent dispersal with water or oil (except where a chemical reaction could occur).
 - d. Do not wipe or use wiping motion as this may spread the contamination.
5. Remove contaminated clothing (e.g. lab coat, shoes, rubber gloves, etc.), if any, and place in the same area of the laboratory as the spill (shoes should be removed only when there is no possibility of injury or recontamination from broken glass or by contact).
6. Survey the area with appropriate instruments. Check the area around the spill, your hands, clothing and shoes for contamination.
7. Decontaminate the spill area.
 - a. Water and mild soap may be used if necessary.
 - b. Commercially available cleaning supplies should be adequate. If necessary, it is recommended to use them only when other measures such as plain water do not work.
8. Secure all contaminated items in sealed containers to prevent spread of contamination.
9. Notify the RSO at the first opportunity.
10. Permit no further work until so authorized by the RSO.
11. All incidents must be documented. This documentation must include the final survey indicating that all contamination has been removed.

MAJOR SPILLS

The investigator shall:

1. Notify all personnel within the lab and in the vicinity of the lab, as appropriate.
2. Block off the area. Keep bystanders out of the area. Assemble persons who were in the lab at the time of the incident in a place near enough to the contaminated area to minimize the spread of contamination but far enough away to prevent continued involvement.
3. Following a liquid spill, use rubber gloves to place the container in an upright position; make no immediate attempt to clean up the spill.
4. If the spill is on the skin, flush thoroughly with water, avoiding the use of organic solvents or harsh/abrasive cleaners.
5. If the spill is on the clothing, remove the outer garments immediately.



6. Leave the room and prohibit entrance into the contaminated area. Do not track contamination beyond the area. Remove shoes or put protective covers over shoes before leaving the contaminated area.
7. Notify the RSO immediately, giving all details of the spill.
8. Permit no one to work in the area until cleared by the RSO.

ACCIDENTS INVOLVING RADIOACTIVE AEROSOLS (dust, mists, fumes, organic vapors, and gases may or may not be spills)

The investigator shall:

1. Ensure that other persons vacate the room at once.
2. While holding one's breath; turn off any circulating devices (e.g. fans, etc.) and hoods, if possible.
3. Vacate the room as soon as possible.
4. Notify the RSO immediately.
5. Ascertain that all doors to the area are closed and locked.
6. Post guards if necessary.
7. Allow no one to enter the room until cleared by RSO.

INJURIES TO PERSONNEL USING RADIOACTIVE MATERIALS

The objectives for handling radiological emergencies are to assist injured personnel, minimize the radioactive material entering into human body, prevent the spread of contamination, and remove the contamination as soon as possible.

Contaminated areas of the body need to be identified using appropriate survey methods. Do not use any decontamination methods which may spread material, increase penetration into the body, or spread to wounded area, if any.

Loose particles may be removed by gently applying adhesive side of tape to the particles attached to skin. Most contamination may be removed by running water over the contaminated area. Use soap or detergent if water by itself doesn't remove all the contaminants, by applying gentle scrubbing. Avoid harsh scrubbing which may increase skin penetration.

The investigator shall:

1. Ensure that all minor wounds are washed under running water immediately, spreading the gash, cut, etc. to maximize removal of contamination.
2. Ensure that proper first aid is rendered immediately in the case of a serious accident.
3. Contact a physician immediately.
4. Report all accidents or injuries to the RSO immediately; this pertains to overexposure, ingestion, inhalation, etc. as well as cuts or other injuries.
5. Permit no person involved in a radioactive injury to return to work without the approval of the attending physician and the RSO.

FIRES INVOLVING RADIOACTIVE MATERIALS

1. Sound the building alarm; this will evacuate the building.
2. Notify Security 692-1911/0911 and the RSO; provide the exact location of the emergency and the type of emergency.
3. Ensure that lookouts are posted to direct the HFD to the emergency and to inform them of the radiation hazards involved.
4. Attempt to put out the fire if a radiation hazard is not immediately present, if trained in the use of a fire extinguisher and if it can be done without endangering oneself.
5. Inform HFD of the exact nature of the hazards involved and remain in the area (if not injured) at least until the RSO arrives.
6. Assist the RSO with monitoring HFD personnel after the fire, if requested.
7. Allow no one to enter the area until cleared by HFD and the RSO.



SPILL RESPONSE FLOWCHART

Notify other personnel in the vicinity.

Assess the extent of the contamination and ask yourself:

MINOR SPILL

1. Can I realistically handle this incident without help and without undue risk to me?
2. Do I have the resources that I need?

3. Only allow personnel assisting spill response to enter contaminated area.
4. Post signs of spill occurrence at entrances / exits and prevent others from entering the area.
5. Change any contaminated PPE (gloves, shoes) immediately.

Spill Decontamination Procedures

6. Get supplies / spill kit materials (lab coat, sturdy disposable gloves, shoe covers (if appropriate), paper towels or other absorbent, decontamination solution or soap/water, radioactive waste container or sturdy polypropylene bag, and survey supplies)
7. Change gloves frequently to prevent spread of contamination, watch for rips and tears.
8. Use a survey meter to carefully define the extent of the contaminated area.
9. Mark the contaminated area with tape or other marking.
10. Start clean-up at the edge and work inward.
11. Place absorbent material on liquid spills
12. Place wet absorbent material on dry spills
13. Let absorbents pick up spilled material – do not wipe as it may spread contamination.
14. Decontaminate spill area with soap & water or commercially available cleaning supply.
15. Change or remove contaminated PPE / clothing.
16. Secure all contaminated items in sealed containers until waste disposal.
17. Survey the area to ensure decontamination.

18. Notify UH Radiation Safety Office at 956-6475.
19. Notify JABSOM EHSO at 692-1854.

21. No entry until cleared by the UH Radiation Safety Office.
22. Document incident.

MAJOR SPILL

1. Is contamination widespread?
2. Do I need help to readily define and clean up the contamination?

3. Block access to contaminated area.
4. Prevent or minimize spread of contamination.

4. If can be done safely, use appropriate PPE and stop spill from continuing/spreading.
5. **Do not attempt to clean spill.**

6. If you or other personnel are contaminated:
 - a. If on skin, flush at least 15 minutes with water
 - b. Remove contaminated clothing immediately.

7. Leave room and restrict entry.
8. Remove shoes or use protective covers over shoes before leaving contaminated area.

9. Notify UH Manoa Radiation Safety Office at 956-6475 immediately.
10. Notify JABSOM EHSO at 692-1854.
11. Notify JABSOM Security at 692-1911/0911.

12. No entry until cleared by the UH Radiation Safety Office.
13. Document incident.