

Section 7. Hazardous Chemical Leak or Spill

Resources

Commercial spill kits are available within the laboratory areas where chemicals are used. The kits are equipped to handle spills of acids, solvents or other specialized materials that have been identified by the staff.

First aid kits, eye-wash stations and emergency showers are strategically located at the marked sites.

Material Safety Data Sheets are available in hard copy at the IRF Security Control Desk, Shipping and Receiving and in the RML Safety Office.

RML HAZMAT Team

RML has a trained HAZMAT Team that may be called upon to assist in spill response for either large quantities of materials or for unknown materials. The HAZMAT team may be contacted by dialing 0 and reporting the spill to the IRF Security Control Desk. They will contact the appropriate personnel.

Spills involving smaller quantities of either highly toxic or flammable materials outside fume hoods may require help from the RML HAZMAT team. Conversely, the RML HAZMAT team is probably not needed for spills involving larger quantities of low hazard materials, such as oils or buffer solutions. When in doubt, contact the RML HAZMAT team for assistance.

The RML Occupational Safety and Health Manager should be contacted in the case of any hazardous chemical leak or spill.

General Procedures

This general procedure should be adopted for each area specific to the design of the laboratory, type of work and the quantities and types of chemicals and other hazards present within the specified area.

- Attend to any persons who may have been contaminated.
- Notify persons in the immediate area about the spill.
- Evacuate all nonessential personnel from the spill area.
- If the spill material is flammable, turn off ignition and heat sources. Leave on all available exhaust ventilation systems.
- Avoid breathing vapors of the spilled material. If required, use respiratory protection if available; if not leave area to a safe location until equipment required is available and contact the RML Occupational Safety and Health Manager immediately.

- If needed, to prevent others from entering the laboratory, place a "**DO NOT ENTER-HAZARDOUS SPILL**" sign on the door. The sign should include the date and time of posting and directions to contact the RML Occupational Safety and Health Manager. No one should return to the spill area until approved by the OSHM.
- Use available material to start to neutralize the spilled material as soon as it is identified. If insufficient material is available for the complete cleanup, identify what is required.
- During the cleanup all procedures to ensure that additional contamination of the site and personnel does not occur must be followed.
- Once the spilled substance is identified, a Material Safety Data Sheet (MSDS) should be made available for additional information. MSDS are available in hard copy at the IRF Security Control Desk or from the RML Occupational Safety and Health Manager.
- Most hazardous materials become hazardous wastes when spilled unless the substance can be recovered or recycled, therefore wastes from spills need to be properly disposed of. Do not dispose of any spilled hazardous material as general refuse unless so instructed by either the Environmental Compliance Officer or RML HAZMAT team.
- Any significant chemical spill or leak should be reported to the RML Occupational Safety and Health Manager; an investigation will be conducted to determine the cause. Preventive measures that are needed will be established and guidance given to personnel to prevent future similar occurrences.
- The DO NOT ENTER sign may not be removed, and no work may resume until approved by the Occupational Safety and Health Manager.

Handling of Spilled Liquids

- Confine or contain the spill to the smallest area possible.
- For small quantities of inorganic acids or bases, use a neutralizing agent or an absorbent mixture (these are available in the chemical spill response kits)
- For larger amounts of inorganic acids and bases use absorbent pillows and dike material to absorb the liquid. The remaining liquid can be neutralized with the appropriate neutralizing agent. In some cases the area can be flooded to dilute the spilled material, however this can only be done if no additional hazards will be caused by this action. If this cannot be determined, do not proceed with this type of action.
- For spills of other materials, absorb the spill with nonreactive material.
- When the spilled material has been contained and neutralized the following actions can be taken:

- Mop up the spill, wringing the mop in a pail. DO NOT put any liquid in the drains that has not been neutralized.
- Carefully pick up any cartons or bottles that have been slashed or immersed. These are to be wiped and set aside. Also remove any other material that may become contaminated during the clean up.
- Vacuum cleaners equipped with HEPA filters can be used to vacuum the area of a spill. Contact the RML HAZMAT team to determine if this type of equipment is needed.
- If the spill material is extremely volatile, let it evaporate and be exhausted by the mechanical ventilation system (provided that the hood and associated mechanical system is spark-proof).

Handling Spilled Solids

Generally, sweep spilled solids of low toxicity into a dust pan and place them in a solid-waste container for disposal of hazardous material. The hazardous material will have to be identified on the disposal form. Additional precautions, such as the use of a vacuum cleaner equipped with a HEPA filter, may be necessary when cleaning up spills of more highly toxic solids.

If a spilled chemical (liquid or solid) is neutralized as per instructions on the absorbent material used, check to ensure that the material has been neutralized and dispose in local landfill if other hazards are not present. Spilled flammable solvents that are absorbed by the spill pillows or other absorbing materials must be removed in waste disposal pails to a safe holding area. The potential of a fire is still present.

Handling of Toxic Gases in Gas Cylinders (leaks of compressed gas cylinders)

Occasionally, a cylinder or one of its component parts develops a leak at the top of the cylinder, in areas such as the valve threads, safety device, valve stem or valve outlet.

- If a leak is suspected, notify the RML Occupational Safety and Health Manager.
- Laboratory workers should never attempt to repair a leak at the valve threads or safety device; rather, they should consult with the supplier.
- To move a cylinder with slow to medium leaks through populated portions of the building, place a plastic bag, rubber shroud, or similar device over the top and tape it (duct tape is preferred) to the cylinder to confine the gas.
- For flammable, inert, or oxidizing gases: Move the cylinder to an isolated area (away from combustible materials if the gas is flammable or is an oxidizing agent). Post signs that describe the hazards and state warnings.
- For **large leaks**, or when the nature of the leak constitutes a more serious

hazard protective apparel may be required. The response may also include any of the following steps:

- Evacuation of personnel.
 - Rescue of injured personnel by crews equipped with adequate personal protective apparel and breathing apparatus.
 - Fire fighting action.
 - Emergency repair.
 - Decontamination.
- Corrosive gases: follow the same procedure as for toxic gases.

Handling Spills Containing Radioactive Material

The RML Radiation Safety Officer should be contacted in the case of any radioactive material leak or spill

Accidental Spills of Radioactive Materials

Spills of radioactive materials may be divided into 2 general categories: (1) minor spills, involving minimal hazards potential (2) major spills, involving significant exposure potential. Any spill involving a volatile radioisotope, such as radioiodine, should be regarded as a major spill.

Minor Spills

- Notify all personnel in the spill area of the accident and ask them to restrict access to the contaminated area.
- Prevent the spread of contamination by covering the spill with absorbent paper.
- Contact the RSO or a member of the RML Radiation Safety Committee and give the following information:
 - The location of the accident
 - The type and activity of radioactive material involved
 - Your name and phone number.
- Individuals who may have been contaminated should move carefully, to avoid spread of contamination, to a nearby area for evaluation by the RSO.
- If possible, wait until the RSO, a member of the RSC or an Authorized User arrives before attempting to decontaminate the area.
- The RSO will provide instructions and assistance in decontamination.

- Clean up of the spill is accomplished using absorbent paper toweling. To avoid spread of contamination, clean from the outer edges towards the center of the spill. Always wear protective clothing including disposable gloves, goggles, lab coats or coveralls.
- Carefully fold the absorbent paper with the clean side out and place in a plastic bag for transfer to a radioactive waste container. If the spill is dry or of powder material, place a moistened towel over the spill to prevent airborne spread.
- Continue cleaning with detergent and water. Survey the spill area with an appropriate survey meter and wipe tests. Also check the area around the spill for contamination until activity is equal to background levels.
- Evaluate personnel involved in the spill and cleanup for contamination. If contamination is found on clothing, the clothing should be removed and held for evaluation by the RSO. If skin is contaminated, wash with mild detergent and water or shower if facilities are available. For further information consult the following section: "General Procedures for Decontamination of Personnel."
- Do not allow work to resume in the laboratory area until approved by the RSO.
- Provide a written report of the incident to the RSO listing individuals involved, corrective actions taken and wipe test results of the area.

Major Spills (where any release of volatile material occurs, including any release of radioactive gases or spillage of stock solutions occur)

- Notify all persons in the area and instruct those not involved to vacate the room.
- Contact the RSO or a member of the Radiation Safety Committee and give the following information:
 - Location of the accident
 - Type and activity of radioactive material
 - Your name and phone number.
- Prevent the spread of contamination by covering the spill with absorbent paper.
- Shield the source if appropriate without causing further contamination.
- According to the direction of the RSO, survey all personnel who could have been contaminated. Decontaminate according to general procedures given below.
- Close and lock the room or secure to prevent entry. Prevent others from entering the laboratory by placing a "**DO NOT ENTER-RADIOLOGICAL SPILL**" sign on the door. The sign should include the date and time of posting and directions to contact the RML Radiation Safety Officer.

- No one should return to the spill area until approved by the RSO
- The RSO will provide instructions and assistance in accomplishing decontamination of the room.
- The DO NOT ENTER sign may not be removed, and no work may resume until approved by the RSO.
- Provide a written report of the incident to the RSO listing individuals involved, corrective actions taken and wipe test results of the area.

General Procedures for Decontamination of Personnel

- Wash body area involved thoroughly for two or three minutes repeatedly “soaping” and rinsing. Synthetic detergents are preferred to soaps.
- Avoid irritation or abrasion of the skin. Also avoid use of organic solvents.
- If a person's eyes are splashed with radioactive materials, immediately flush the eyes with copious amounts of water.
- If above decontamination methods are not fully effective, perspiration may be induced by covering the affected area with plastic wrap. Then wash the affected area again to remove contamination that was released by the perspiration.
- Notify the RSO and your supervisor immediately after an accident involving contamination.

Section 8. Biological Incidents

Biological Incidents include:

- spills and leaks of infectious material
- accidents with infectious agents where personal injury has occurred
- leakage of potentially contaminated liquid from any part of the IRF's effluent treatment area
- accidental inoculation such as from a needle, broken glass vessel or animal bite

The response to a Biological Incident will vary according to the Biological security and/or safety risk posed by the infectious agent, whether or not people are injured or are at risk of infection and the extent and location of the spill or leak.

Emergency Steps to Take in the Event of a Biological Incident

In considering the response to **ANY** incident, the first priority is the safety of people involved. Your immediate task is to ensure that appropriate action is taken to attend to any serious injuries or life-threatening situation, and to ensure that you and others are not exposed to liquid or aerosols from the leaked material.

The second priority is to take whatever immediate action is required to limit the spread of infectious material, **where this can be done without increasing the danger to yourself or others and where you are competent to do so**. Action will depend on the agent involved, the nature of the substance (e.g. liquid or aerosol), the type of incident and its location.

Third, the spilled or leaked material is to be cleaned up, disinfected and the area or equipment made safe again. Whether or not staff involved in the incident should do this themselves, or whether the incident is immediately reported to the Biosafety Officer for action will again depend upon what the material is and where the incident occurred (see Reporting section below).

Finally, all Biological incidents must be reported to the laboratory supervisor, the RML Biosafety Officer, and the RML Occupational Safety and Health Manager. As just indicated, reporting prior to attempting clean up may be warranted to determine if a specialized procedure can be adopted.

Most importantly, remember:

IF THE SITUATION IS BEYOND YOUR CONTROL LEAVE THE AREA IMMEDIATELY. CONTACT THE IRF SECURITY CONTROL DESK OR THE RML BIOSAFETY OFFICER AS SOON AS YOU ARE IN A SAFE LOCATION.