Radiation Safety Program
Hunter College of the City University of New York

1. Guidelines for All Users of Radioactive Materials

This document presents the guidelines for all persons using radioactive materials. Adherence to these rules is strictly required. These guidelines represent minimum standards of good practice required of all licensees and persons working with radioactive materials.

1.1. Mouth pipetting is never permitted. Remote pipettes, syringes, or other pipetting aids are to be used.
1.2. Eating or smoking in any laboratory using radioactive materials is never permitted.
1.3. Storage of food in refrigerators is prohibited.
1.4. Gloves are to be worn at all times when working with radioactive materials. Gloves are to be removed immediately after working with radioactive materials and hands should be checked for any contamination.
1.5. Hands should always be washed thoroughly before leaving the laboratory.
1.6. Any item contaminated with radioactive materials should be placed in the containers provided and labeled with "radioactive materials" signs.
1.7. Radioactive materials are to be transported in a manner that prevents spillage or breakage. When liquids are in a glass container, the container should be kept within a second non-breakable vessel. This vessel should be large enough to contain all of the liquid from the glass container.
1.8. All bench tops are to be covered with an absorbent covering or work should be done within a tray that will contain any spills.
1.9. All work with volatile compounds is to be done in an appropriate hood.
1.10. The door to the laboratory, work and storage areas are to be posted with the appropriate "radiation precaution" signs. These signs are available from commercial suppliers or may be obtained from EHS.
1.11. In the case of emergency, contact Environmental Health and Safety. During off hours or weekends call the office of Public Safety.
1.12. Shipments are to be opened in a hood if there is any possibility of volatilization of the material. When a package containing radioactive material is opened, a check is to be made to determine if there is any physical damage to the package, contamination of the packing material or the vial in which the material is contained. If contamination is found, immediately contact EHS, Radiation Safety.
1.13. An area is to be provided within the laboratory for storage of radioactive materials. This area shall provide sufficient shielding to maintain exposure levels ALARA, and to prevent release of the material.
1.14. All laboratories containing radioactive materials are to be locked when personnel are not present.
1.15. All containers that no longer hold radioactive material are to be checked for contamination before disposal. If free of contamination, signs on the container are to be defaced before disposal.
1.16. Laboratories using high energy beta or gamma radiation are to have a survey meter available. This survey meter is to be calibrated yearly.
1.17. Emergency procedures are to be posted in each laboratory. It is the responsibility of the User/laboratory head to see that employees are familiar with these procedures.
1.18. The "Notice to Employees" document of the NYC Department of Health is to be posted in every laboratory.
1.19. Contamination checks of all working areas are to be performed at least monthly.
1.20. If personnel dosimeters are provided to laboratory personnel, they are to be worn at all times in the laboratory. Personnel monitors are to be stored in an area where radiation is not present. Personnel monitors are to be returned on a timely basis.
1.21. Persons under the age of 18 are not to be employed to work with radioactive materials.

2. Procedures for Demarcating Areas and Posting of Signs and Labels

2.1. **CAUTION RADIOACTIVE MATERIALS** sign must be posted at the entrance of each laboratory or area where radioactive materials are used or stored. The sign must include the name and home phone number of the licensee.
2.2. Refrigerators, freezers, and other 'in lab' storage areas and containers in which materials are stored or transported must have a visible label with the radiation caution symbol and the words **CAUTION RADIOACTIVE MATERIALS**. The label should also state the kind and quantity of material in the container.
2.3. Areas in the laboratory where radiation levels might expose a person to 5 millirem in any one hour, or 100 millirem in 5 consecutive days must be posted with the sign **CAUTION RADIATION AREA**.
2.4. Laboratory equipment (flasks, beakers, centrifuges) containing radioactive materials need **NOT** with radioactive labels or markings as long as the user is present and the material is in a designated and marked radioactive material work area. Unattended and contaminated equipment and tools must be marked with warning tape or labels.
2.5. Radiation Safety personnel may post areas and equipment to indicate significant levels of contamination found during surveys and may specify additional postings to control access or to ensure safe operations. These signs are to be removed only when the article or area has been satisfactorily decontaminated.

3. Procedures for Ordering and Receiving Radioactive Material

3.1. The Radiation Safety Officer or a sole designate must authorize each order for radioactive materials and ensure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.
3.2. The Radiation Safety Officer will establish and maintain a system for ordering and receiving radioactive material. The system must contain the following information:
   3.2.1. Written records that identify the isotope, chemical form, activity, and supplier will be made.
   3.2.2. The above records will be checked to confirm that material received was ordered through proper channels.
3.3. For deliveries during normal working hours, the Radiation Safety Officer will tell carriers to deliver radioactive packages directly to a specified area.

3.4. For deliveries during off-duty hours, the Radiation Safety Officer will tell security personnel or other designated persons to accept delivery of radioactive packages in accordance with procedures outlined in the sample memorandum below (item No. 11).

4. Procedures For Opening Packages Containing Radioactive Material

For all packages, the following procedures for opening packages will be carried out:

4.1. Put on gloves to prevent hand contamination.

4.2. Visually inspect package for any sign of damage (i.e. wetness, crushed). If damage is noted, stop procedure and notify Radiation Safety Officer.

4.3. Open the package with the following precautionary steps:

   4.3.1. Open the outer package (following manufacturer's directions, if supplied) and remove packing slip.
   4.3.2. Open inner package and verify that contents agree with those on packing slip.
   4.3.3. Check integrity of final source container (i.e. inspect for breakage of seals or vials, loss of liquid, or discoloration of packaging material).
   4.3.4. If anything is other than expected, stop and notify the Radiation Safety Officer.

4.4. If there is any reason to suspect contamination, wipe external surface of final source container and remove wipe to low background area. Assay the wipe with an appropriate instrument. The procedure manual should specify the instrument and method to use. Record amount of removable radioactivity (i.e. dpm/100 cm², etc.).

4.5. Take precautions against the spread of contamination as necessary.

4.6. Monitor the packing material and packages for contamination before discarding.

   4.6.1. If contaminated, treat as radioactive waste.
   4.6.2. If not contaminated, deface radiation labels before discarding in regular trash.

4.7. Maintain records of the results of checking each package.
5. Procedures for Responding to a Radioactive Spill

All laboratory personnel should read these procedures prior to working with radionuclides. Estimate the amount of radioactivity spilled and proceed accordingly.

<table>
<thead>
<tr>
<th>Radionuclide</th>
<th>Minor Spill (mCi)</th>
<th>Larger Spill (mCi)</th>
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</thead>
<tbody>
<tr>
<td>P-32</td>
<td>10</td>
<td>&gt;10</td>
</tr>
<tr>
<td>S-35</td>
<td>100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>C-14</td>
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<td>&gt;100</td>
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<td>H-3</td>
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</tr>
<tr>
<td>I-125</td>
<td>1</td>
<td>&gt;1</td>
</tr>
</tbody>
</table>

5.1. MINOR SPILLS

5.1.1. NOTIFY: Notify persons in the area that a spill has occurred.
5.1.2. PREVENT THE SPREAD: Cover the spill with absorbent paper (use damp paper in the case of dry spills; for wet spills place the adsorbent paper over the liquid).
5.1.3. CLEAN UP: Use disposable gloves. Carefully fold the absorbent paper and pad. Insert into a plastic bag and dispose of in the radioactive waste container. Also insert into the plastic bag all other contaminated materials such as disposable gloves.
5.1.4. If personal contamination occurs, follow the steps in item 5.5.
5.1.5. SURVEY: Wipe the area around the spill. Be sure removable contamination is less than 200 dpm/100 cm² for radioiodine and 1000-dpm/100 cm² for all other radionuclides.
5.1.6. REPORT: Report incident to the Radiation Safety Officer.

5.2. MAJOR SPILLS

5.2.1. Notify persons not involved to vacate the room at once.
5.2.2. If the spill involves a container with liquid, upright the container (have hands protected with gloves). If the spill involves a gas, fume, mist or dust, follow the procedures in item 5.3
5.2.3. If spill is on skin, flush thoroughly.
5.2.4. If spill is on clothing remove at once.
5.2.5. Turn off all fans or ventilation, if possible.
5.2.6. Leave the room.
5.2.7. Notify Environmental Health and Safety, Radiation Safety.
5.2.8. Decontaminate personnel involved as per item 5.5 and the instructions from Radiation.
5.2.9. Decontaminate area as per Radiation Safety instructions.
5.2.10. All persons involved must be monitored.
5.2.11. Permit no person to resume work in the area until a survey by Radiation Safety is made.

5.3. RADIOACTIVE DUSTS, MISTS, FUMES, GASES, ETC.

5.3.1. Notify other persons to vacate room.
5.3.2. Hold breathe, close valves, turn off air-circulating devices, as time permits.
5.3.3. Vacate room.
5.3.4. Close all doors - post area.
5.3.5. Notify Environmental Health and Safety, Radiation Safety unit.
5.3.6. Report suspected inhalations of radioactive material.
5.3.7. Detain all persons suspected of being contaminated. Decontaminate personnel involved as per item 5.5, if applicable, and the instructions from Radiation.
5.3.8. Decontaminate as instructed by Radiation Safety.
5.3.9. An air survey must be performed before work can be resumed.

5.4. FIRES INVOLVING POSSIBLE RADIATION HAZARDS

5.4.1. Sound alarm.
5.4.2. Call Operator and report location.
5.4.3. Notify Radiation Safety through the Environmental Health and Safety Department.
5.4.4. Close all doors & windows.
5.4.5. Extinguish the fire, if possible.
5.4.6. Decontaminate area before work is resumed in the area.

5.5. INJURIES INVOLVING RADIATION HAZARDS

5.5.1. Remove any clothing. Contaminated clothing should be stored for further evaluation by Radiation Safety.
5.5.2. Wash minor wounds immediately, under running water and mild soap, spreading edges of wound.
5.5.3. Check for contamination, if contamination remains, wash again. You can also induce perspiration by covering the area with plastic and wash the affected area again to remove any contamination that was released by perspiration.
5.5.4. Notify Radiation Safety through the Environmental Health and Safety office.
5.5.5. Have employee proceed to first aid.
5.5.6. In the case of traumatic injury, call 911.