



Title: **Radiation Emergency Spill Procedures**

Number EH&S -6-7

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Pages 5

**PURPOSE:** To establish procedures to be followed in the event of a radiation emergency.

**SCOPE:** Hospital wide.

## **PROCEDURES:**

### **I. Accidental Spills of Radioisotopes**

1. Depending on the quantity and radiotoxicity of the material involved, spills may be divided into two general categories: 1) minor spills, involving minimal hazard potential, and 2) major spills, involving significant exposure potential. See Appendix A for a guide to assessing the hazard potential of spills.

### **II. Minor Spills**

1. Notify all personnel of the accident and restrict access to the contaminated area until the Department of Environmental Health and Safety Radiation Safety Officer arrives.
2. Individuals who may have been contaminated should be taken to a nearby contamination free area for evaluation.
3. Contact University Police at 911 and request the Radiation Safety Officer. Be sure to specify that the emergency involves ionizing radiation and provide specifics on what happened.
4. If appropriate instrumentation is available, an evaluation should be made of personnel contamination.
  - a. If contamination is found on clothing, the clothing should be removed and held for evaluation by the Radiation Safety Officer.
  - b. If skin is contaminated, wash with detergent and water, or shower, if facilities are available. Resurvey after washing.
5. Confine the spill as soon as possible. Before proceeding, however, individuals must obtain protective clothing (disposable gloves, goggles, lab coats or coveralls, shoe covers, and if necessary, respirators). Ask the Radiation Safety

Officer for necessary decontamination materials if they are not available in the laboratory.

6. Before proceeding with clean-up, use an ionization survey instrument to evaluate external radiation levels.
7. Clean up the spill using a detergent and water (commercial decontamination agents are available). In the case of liquid spills, use absorbent paper or granular solid absorbent on the spill, and deposit soaked clean-up material in a radioactive waste container or plastic bag. If the spill is a powder or dry material, moisten carefully before clean-up in order to prevent airborne activity.
8. Continue decontamination until no removable activity is detected by smear method.
9. Monitor all persons involved in the clean-up and make sure that everyone is clean before leaving the area.
10. Prepare a written report of the incident and list the individuals involved. The survey results must be included and a copy sent to the Radiation Safety Officer within the week.

### **III. Major Spills**

1. Notify all personnel of the accident and restrict access to the contaminated area until the Department of Environmental Health and Safety Radiation Safety Officer arrives.
2. Individuals who may have been contaminated should be taken to a nearby contamination free area for an evaluation.
3. Contact University Police at 911 and request the Radiation Safety Officer. Be sure to specify that the emergency involves ionizing radiation and provide details about what happened.
4. If contamination is apparent by measurement or observation, remove clothing and shower. After shower, resurvey to determine the need for further decontamination, if any. Hold all contaminated items for the Radiation Safety Officer.
5. Do not decontaminate the area until the Radiation Safety Officer arrives. The facility should be secured to prevent unauthorized access.
6. Permit no person to resume work in the area until the Radiation Safety Officer has made a final survey and given approval for reoccupancy.
7. Prepare a complete written report of the accident and list the individuals involved. A copy must be sent to the Radiation Safety Officer within one week.

**IV. General Decontamination Procedures for Personnel**

1. For decontaminating skin surfaces, it is most effective to begin with simple washing procedure and progress to more involved procedures until the contamination is reduced to an acceptable level. The following is a list of the decontamination sequence:
  - a. Wash with water and detergent
  - b. Scrub with water and detergent
  - c. Treat with chemical cleaning agents
2. Between each step of the procedure the contaminated area should be checked to determine if contamination is still present.
3. Chemical treatment is to be used only when absolutely necessary, and the only under the direction of the Radiation Safety Officer.

**V. Radioisotope Spills Involving Other Hazardous Agents**

1. If a spill involves other hazardous agents in combination with a radioactive material such as toxic or flammable chemicals, carcinogenic chemicals, or pathogenic micro-organisms (viruses, bacteria), the Radiation Safety Officer should be advised and will recommend special decontamination procedures and equipment necessary for personnel safety.

**VI. Lost Radiation Sources**

1. If sealed radiation sources are lost or misplaced, the Radiation Safety Officer must be contacted immediately. The longer the source is missing, the more difficult it will be to locate, and greater the potential hazard to personnel.
2. Caution must be exercised in recovering a lost source to avoid unnecessary personnel exposure. The source encapsulation may have become ruptured, or the source capsule may have fallen out of the protective shield. Adequate monitoring instrumentation, provided by the Radiation Safety Officer, is necessary to properly evaluate such potential hazards.

**INQUIRIES/REQUESTS:**

Environmental Health and Safety  
L1-059 HSC  
Zip 8017  
Main Office: 444-6783

**TITLE: Radioaction Emergency Spill Procedures**

**POLICY: 6-7**

FAX: 444-6845

**RELATED FORMS:**  
(Appendix A)

Assessing Spills: Hazards of Radioactive Materials

**RELATED DOCUMENTS:**

## **APPENDIX A**

### **Assessing Spills: Hazards of Radioactive Materials**

#### **Low Hazard**

Above 1 mCi, treat as a major spill

H-3, Be-7, C-14, F-18, Ni-59, Zn-69, Ge-71, U-238, Natural Thorium, Natural Uranium, Noble Gases.

#### **Medium Hazard**

Above 100 uCi, treat as a major spill

C-14, Na-24, Si-31, P-32, S-35, Cl-36, K-42, V-48, Cr-51, Mn-54, Mn-56, Fe-55, Fe-59, Cu-64, Zn-65, Ga-72, As-76, Pb-86, Sr-89, Y-90, Y-91, Zr-95, Nb-95, Mo-99, Ru-103, Rh-105, Pb-10b, Ag-105, Ag-111, Cd-109, Sn-113, Te-127, mTe-129, Ba-140, La-140, Pr-143, Pm-147, Sm-151, Ho-166, Tm-170, Lu-177, Re-183, Ir-190, Pt-191, Pt-193, Au-196, Au-198, Au-199, Tl-200, Tl-201, Tl-202, Tl-204, Pb-203, Rn-220, Rn-222, U-135.

#### **High Hazard**

Above 10 uCi, treat as a major spill

Na-22, Ca-45, Sc-46, Co-60, Sr-90, Ru-106, I-129, I-131, Cs-137, Ce-144, Eu-154, Ta-182, Bi-210, At-211, Ra-224, U-233.

#### **Very High Hazard**

Above 10 uCi, treat as a major spill

Pb-210, Po-210, Ra-226, Ra-228, Ac-227, Th-228, Th-230, Np-237, Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Am-241, Cm-242.