

A. EMERGENCY PROCEDURES{ TC "Emergency Procedures" \1 2 }

1. We are all human and occasionally make mistakes. There is no shame in reporting spills or contamination. There is considerable NOT REPORTING an accident involving radioactive materials. On the recommendation of the Radiation Safety Committee, the VP & Dean for Research and Sponsored Programs may remove the privilege to handle radioactive materials from persons failing to report promptly any emergencies involving radioactive materials.
2. **Low-Level Spills**
 - a. A low-level spill is one that is confined to a limited area and does not increase the radiation levels in the area beyond the acceptable limits of 2 mR/hr.
 - b. The spill is confined to absorbent paper or an impervious tray.
 - c. Radiation levels 1 meter from the center of the spill do not exceed 2 mR/hr.
 - d. The total quantity of material spilled is greater than 1 uCi but less than 1 mCi.
 - e. The licensed principal investigator supervising the activities in the laboratory where the spill occurred must be notified immediately. The investigator is responsible for assuring that the spilled material is collected and disposed of properly. Decontamination procedures should include the following steps:
 - (1) If the spill was absorbed by bench paper, collect the paper and place it into a plastic bag. Label the bag and place it into the appropriate radioactive waste drum.
 - (2) If the spill was confined to an impervious tray, wash the tray with decontamination solution. The rinse water may be disposed of in the sink if levels of radiation are within permissible limits (see Disposal). Otherwise, it must be disposed of as radioactive liquid waste and placed into the appropriate container.
 - (3) Clean the surrounding area with decontamination solution.
 - (4) Following decontamination procedures the area should be monitored with a survey meter and surface wipes. If contamination persists decontamination procedures must be repeated until detectable radiation levels are as low as reasonably achievable (ALARA).
 - (5) The principal investigator is responsible for submitting a Radioactive Contamination Report to the Radiation Safety Officer within 7 days. The report will be retained in the Radiation Safety Office.
 - (6) Remember:
 - (a) NOTIFY: Notify persons in the area that a spill has occurred.
 - (b) PREVENT THE SPREAD: Cover the spill with absorbent paper.
 - (c) MARK OFF THE AREA: Do not allow anyone to leave the area without being monitored.
 - (d) NOTIFY THE RADIATION SAFETY OFFICE.
 - (e) CLEAN UP: Use disposable gloves and remote handling tongs. Normal cleaning agents should be adequate or use "Count-Off". Keep cleaning supplies to a minimum. Proceed from the outermost edges of the contaminated area inward. Place cleaning materials into a plastic bag and dispose of in the radioactive waste container. Also put into the plastic bag all other contaminated materials such as disposable gloves.
 - (f) SURVEY: With a low-range, thin-window G-M survey meter, check the area around the spill, hands, and clothing for contamination
3. **Major Hazard Spill**
 - a. A major hazardous spill is any spill that is more significant than a low-level spill. A spill is a major hazardous spill if it meets any of the following criteria:
 - (1) The quantity spilled is greater than 1 mCi.
 - (2) The quantity spilled is greater than 1 uCi and is not confined to absorbent paper or an impervious tray.
 - (3) Radiation levels 1 meter from the center of the spill exceed 2 mR/hr.
 - (4) THE RADIATION SAFETY OFFICER MUST BE NOTIFIED

IMMEDIATELY WHEN A MAJOR HAZARDOUS SPILL OCCURS.

- (5) The Radiation Safety Officer and the Department RSO will determine the extent of the spill by survey meter and wipes of the surrounding area. The contaminated area will be labeled with tape and cordoned off to prevent inadvertent entry into the area. Only radiation safety personnel and the principal investigator may enter the area until the decontamination procedures are completed.
- (6) The Radiation Safety Office is responsible for directing the decontamination and assuring that the area is as free of contamination as reasonably achievable when decontamination procedures are completed. The principal investigator is responsible for promptly executing the decontamination procedures deemed necessary by the Radiation Safety Officer.
- (7) The Radiation Safety Officer and the principal investigator will complete a Radioactive Contamination Report. A meeting of the Radiation Safety Committee will be convened to determine corrective measures to prevent, if possible, future hazardous spills of a similar nature.
- (8) Reports to the State of Ohio will be made per OAC 3701-1-38-21 by the RSO.
- (9) Remember:
 - (a) **CLEAR THE AREA:** Notify all persons not involved in the spill to vacate the room
 - (b) **PREVENT THE SPREAD:** Cover the spill with absorbent pads, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.
 - (c) **SHIELD THE SOURCE:** If possible, the spill should be shielded, but only if it can be done without further contamination or without significantly increasing your radiation exposure.
 - (d) **CLOSE THE ROOM:** Leave the room and lock the door(s) to prevent entry.
 - (e) **CALL FOR HELP:** Immediately notify the Radiation Safety Officer.
 - (f) **PERSONNEL CONTAMINATION:** Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Officer. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

4. External Bodily Contamination

- a. Radioactive materials in contact with body surfaces (e.g., hands) should be removed promptly using approved decontamination products such as D-Con or Radwash. The area should be scrubbed gently and rinsed with lukewarm water.
- b. **DO NOT USE HARD OR CAUSTIC SOAPS.**
- c. **DO NOT SCRUB THE AREA WITH AN ABRASIVE TOOL (e.g., SCRUB BRUSH).**
- d. **AVOID PROCEDURES THAT MAY BREAK THE SKIN CAUSING POTENTIAL TRANSFER OF MATERIAL INTERNALLY.**
- e. The Radiation Safety Officer should be notified if the material in contact with the skin:
 - (1) Exceeds 10,000 dpm.
 - (2) Is in a chemical form that may readily be absorbed.
 - (3) Gives a dose greater than 500 mR
 - (4) If any of these conditions exist, the Radiation Safety Officer will determine whether decontamination can proceed on site or in the Emergency Room facilities of Robinson Memorial Hospital (Ravenna, Ohio).
- f. If decontamination is carried out on site under the direction of the Radiation

Safety Officer, he will perform a urinalysis bioassay to determine whether the individual can be considered decontaminated. The Radiation Safety Officer will complete the Radioactive Contamination Report.

5. Internal Bodily Contamination
 - a. Ingestion or injection of radioactive materials must be reported to the Radiation Safety Officer or his staff immediately. They will transfer the individual as a patient to the Emergency Room facilities of Robinson Memorial Hospital (Ravenna, Ohio).
6. The maximum limits suggested for fixed contamination on hands, body surfaces, personnel clothing and shoes are:
 - a. Alpha activity - 200 dpm /100 cm²
 - b. Beta-gamma activity - 0.2 mrad/hr at 2 cm.

B. Returning Laboratories and Equipment to Normal Use. {tc “Returning Laboratories and Equipment to Normal Use” \1 2}

1. For areas or equipment to be returned to general use, or for equipment to be sent out for maintenance, activity levels must be below those specified in the NRC document "Guidelines for Decontamination of Facilities & Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material", 1987. For β and γ -emitters average surface contamination levels should be below 5,000 dpm/ 100 cm² with removable levels less than 1,000 dpm/ 100 cm².

The Radiation Safety Officer must be informed prior to the termination of any use of radioisotopes. Areas which are planned to be returned to general, unrestricted use, must have a final survey by the RSO with the results sent to the Decommissioning Group of the Ohio Bureau of Radiation Protection per OAC 1-40-18 (C) (2). Laboratory areas and equipment (including hoods, sinks, refrigerators, freezers, centrifuges, glassware, shielding, storage containers, benchtops, cabinets, and floors) shall be decontaminated or disposed of by the terminating user to the acceptance and approval of the RSO. Equipment and areas which have been cleared will have radioactive materials labels and stickers removed prior to release from the laboratory or disposal to public disposal facilities. When the laboratory is free of all radioactive materials and equipment and all work areas are decontaminated then the Radioactive Materials signs will be removed from the laboratory entrances. Documentation of decontamination surveys and laboratory clearance will remain on file at the Radiation Safety Office for a period of five years