

UAB Radioactive Materials Spill Response Procedure For the Radiation Worker

PURPOSE

The purpose of this procedure is to provide guidance for the protection of personnel during the response and mitigation of spills containing radioactive material.

SCOPE

This response procedure is intended to address the response of major and minor spills containing radioactive material at the University of Alabama at Birmingham.

DEFINITIONS

Activity: means the rate of disintegration or transformation or decay of radioactive material. Indication of the **amount** of radioactive materials present as described and quantified on the units of Becquerel (Bq) and the Curie (Ci).

ALARA: ALARA is an acronym for "as low as (is) reasonably achievable," which means making every reasonable effort to maintain exposures to ionizing radiation as far below the dose limits as practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest. (*The U.S. NRC*)

Radioactive Contamination (working definition): the presence of radioactive atoms or radioactive material in or on areas where it is not intended to be.

RESPONSIBILITIES

It is the responsibility of all radioactive material licensees, all authorized and approved users, and any person who may come in contact with radioactive materials or who may receive exposure from any source of ionizing radiation, to understand and comply with all federal, state, local and institutional rules and regulations that govern sources of ionizing radiation, whether radioactive materials or radiation producing machines. Additionally, the licensees, all authorized and approved users, and any persons who may come in contact with radioactive materials or who may receive exposure from any source of ionizing radiation are responsible for minimizing exposures to ionizing radiation by observing and implementing the ALARA principle at all times.

REQUIRED EQUIPMENT AND MATERIALS:

Your Radiological Spill Response Kit should include, but are not limited to, the following items:

- Plastic bags,
- "Caution Radioactive Material" tape,
- Plastic backed absorbent material such as a "chux" padding
- Paper towels
- Bulb pipets

- 6" (minimum length) cotton-tipped applicators and/or filter papers for conducting wipe tests
- Calibrated, functional Radiological Survey Instrument (Geiger Counter)
- Decontamination detergent such as "Rad Con" (shaving cream or "Scrubbing Bubbles" may be effective)
- Rope, tape, and/or keys to restrict area access and movement
- Disposable gloves,
- Disposable footwear,
- Lab coats, disposable gowns or Tyvek suite
- Safety goggles (if applicable)
- Respirator, such as an N95 (if applicable).
 - *Before relying upon any respirator, please contact the Department of Occupation Health & Safety to conduct an official "Fit Test" to identify the proper respirator and conditions of respirator use.*
- Extra change of clothes

PROCEDURAL STEPS

1. PROCEDURAL STEPS TO ADDRESS THE SPILL

- 1.1.** The definition of a minor or major spill may depend upon several factors such as:
- 1.1.1. The isotope involved,
 - 1.1.2. the activity,
 - 1.1.3. volatility of the material,
 - 1.1.4. how many people were involved
 - 1.1.5. personnel contaminated,
 - 1.1.6. parameter and spread of contamination

2. ADDRESSING A MINOR (Small) SPILL: A Minor spill is considered as a spill that involves:

- One laboratory,
 - No personnel contamination,
 - No radioiodine,
 - Radioactivity that does not exceed 1.0 mCi,
 - Unshielded exposure rates that do not exceed 2.0 mR/hr.
- 2.1. PEOPLE FIRST:** Always attend to any injured persons first.
- 2.2. NOTIFY:** Notify all persons in the area in which the spill occurred.
- 2.3. PREVENT THE SPREAD:** Cover and/or coral the spill with absorbent paper.
- 2.4. CLEAN UP:** Use disposable plastic gloves and, if available, remote handling tongs to carefully clean the spill from the outside inwards. Fold the absorbent paper and pad. Insert into a plastic bag and dispose in the radioactive waste container. Include all other contaminated materials such as plastic gloves.
- 2.5. SURVEY:** Use a GM survey meter, for isotopes that are detectable by GM survey, check the area around the spill, hands, clothing and shoes for contamination. Always perform an extensive wipe survey using the appropriate energy windows. Do not assume that locations outside of the spill area are not contaminated. The wipe test must be comprehensive enough to certify and delineate areas free of contamination versus those that are not.
- 2.6. RESTRICT:** Monitor all personnel suspected of being contaminated. They should not be allowed to freely leave the area until they have been adequately

interviewed and surveyed. Prevent unauthorized entry until room is cleared for unrestricted use.

2.7. REPORT: Report the incident to the Radiation Safety Program immediately.

3. ADDRESSING A MAJOR (Large) SPILL: Major spills are spills that do involve:

- Personnel contamination,
- Locations outside approved work areas
- Radioiodine
- Radioactivity greater than 1.0 mCi
- Unshielded radiation exposure rates that exceed 2 mR/hr.

3.1. PEOPLE FIRST: Always attend to any injured persons first.

3.2. NOTIFY: Notify all persons in the area where the spill occurred and evacuate the area if necessary.

3.3. PREVENT THE SPREAD: Cover and/or coral the spill with absorbent paper or cloths to prevent the spread of contamination beyond the confines of the immediate room.

3.4. CALL RSP: Notify the Radiation Safety Program (RSP) immediately.

3.5. CLEAN UP: Use disposable plastic gloves and, if available, remote handling tongs to carefully clean the spill from the outside inwards. Fold the absorbent paper and pad. Insert into a plastic bag and dispose in the radioactive waste container. Include all other contaminated materials such as plastic gloves.

3.6. ENSURE: Ensure that exposure levels are within acceptable limits.

3.7. SHIELD THE SOURCE: Shield the spill/contaminated area. Take care to prevent spreading the contamination or significantly increasing your radiation exposure. Quickly withdraw to a safe distance when needed.

3.8. VENTILATION SYSTEM: Switch off all fans, air conditioners and hoods and close air vents and hood sashes. In some locations, maintenance will have to be called to turn off the air conditioners.

3.9. RESTRICT: Monitor all personnel suspected of being contaminated. They should not be allowed to freely leave the area until they have been adequately interviewed and surveyed. Prevent unauthorized entry until room is cleared for unrestricted use.

3.10. SURVEY: Use a GM survey meter, for isotopes that are detectable by GM survey, check the area around the spill, hands, clothing and shoes for contamination. Always perform an extensive wipe survey using the appropriate energy windows. Do not assume that locations outside of the spill area are not contaminated. The wipe test must be comprehensive enough to certify and delineate areas free of contamination versus those that are not.

3.11. REPORT: Report the incident to the Radiation Safety Program immediately, and ensure that incident is reported as required in accordance to UAB reporting regulations.

3.12. CLOSE THE ROOM: Leave the room, if necessary. Post the area and prevent unauthorized entry until unrestricted entry has been re-established by the UAB Radiation Safety Officer or designate.

4. MITIGATING PERSONNEL CONTAMINATION:

4.1. Implement the “Internal/External Dose Determination Protocol”

- 4.1.1. Contaminated clothing should be removed and stored for further evaluation by the RSP.

- 4.1.2. If the skin is contaminated, flush and wash thoroughly with mild soap and lukewarm water and notify the Radiation Safety Office immediately.
- 4.1.3. Be advised that the Director of Radiation Safety may require bioassays for internal dose determinations.

PERSONNEL CONTAMINATION

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 cause spread to a wounded area. Loose particles may be removed by gently applying the 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 and by applying **gentle** scrubbing. Avoid harsh scrubbing which may increase skin penetration. If decontamination of personnel was not fully successful, consider inducing perspiration by covering the area with plastic. Then wash the affected area again to remove any contamination that was released by the perspiration. If contamination still persists, stronger decontamination methods may be necessary. Contact the Radiation Safety Office for further instructions.

REPORTING:

Thoroughly document and report all details to the UAB Radiation Safety Officer (RSO) as soon as possible, no later than 24 hours after the spill has occurred. Adhere to all UAB reporting requirements. The radiation spill/emergency report must include the following information:

- Name of person making the report (first and last name, Blazer ID, and phone number)
- Date and time of the incident
- Radioisotope(s) involved
- Total activity (in mCi) of the isotope(s) involved in the spill
- The maximum exposure levels measured at the site
- Building(s) and room number(s) directly and indirectly affected by spill
- Route of entry into the body, if applicable
- Details as to how the spill occurred, including how far the spill spread
- How was the spill and wastes handled and where is the waste now?
- How was access to the affected area controlled
- Who attended to or cleaned the spill (first and last name, Blazer ID, and phone number)
- Names and contact information for all personnel who may have gotten contaminated (first and last name, Blazer ID, and phone number)

EMERGENCY CONTACT INFORMATION

Should you encounter a radiological spill or a lost radioactive source, please do the following:

NORMAL BUSINESS HOURS: (Monday – Friday: **8:00 a.m. - 5:00 p.m.**)

Contact the UAB Department of Occupational Health & Safety (OH&S) at
(205) 934-2487

DURING OFF DUTY HOURS (Holidays and hours outside of normal working hours)

Contact UAB Radio Paging at 934-3411 and ask for the Health Physicist On-Call (HPOC), at pager #7746.

If you cannot get the HPOC, then contact UAB Radio Paging at 934-3411 and ask for the UAB Radiation Safety Officer (RSO) at pager # 8125. RSO cell number is: (205) 383-5228

If you cannot get the RSO, then contact UAB Radio Paging at 934-3411 and ask for the UAB Assistant Radiation Safety Officer (ARSO) at pager # 5591. ARSO cell number is: (757) 304-2251

If you cannot get the RSO, then contact UAB Police Dispatch at (205) 934-4434.