



Safe Operating Procedure

(Revised 7/22)

RADIOACTIVE MATERIAL SPILLS AND RADIATION ACCIDENTS

The instructions contained in this SOP provide additional guidance regarding spills, decontamination, and accidents involving radioactive materials and radiation producing devices in locations that have been approved by the Radiation Safety Committee (RSC). Any spill of radioactive material shall be cleaned up immediately. When performing decontamination and spill clean-up, minimum PPE consists of laboratory coat, eye protection, gloves, and closed toe shoes. Spills are classified as major or minor using the following table.

Table 1. Radioactive Material Spill Classification

Radionuclide	Minor Spill Level	Major Spill Level
C-14	≤1 mCi	> 1 mCi
H-3	≤10 mCi	> 10 mCi
P-32/33	≤ 0.1 mCi	> 0.1 mCi
S-35	≤ 1 mCi	> 1 mCi
I-125	≤0.1 mCi	> 0.1 mCi
Ca-45	≤1 mCi	> 1 mCi
Cr-51	≤ 10 mCi	> 10 mCi
Se-75	≤1 mCi	> 1 mCi
Other Radionuclide	≤0.1 mCi	> 0.1 mCi

Immediate Spill Response Procedures of Radioactive Materials

For **minor spills**, perform the following:

- Don appropriate personal protective equipment.
- Right the container of spilled liquid.
- Notify all persons in the area at once.
- Permit only the minimum number of persons in the area necessary to deal with the spill.
- Confine the spill immediately. If the spill is on clothing, take necessary precautions to prevent direct contamination of skin.
- Drop absorbent paper on a liquid spill; dampen dry spills to prevent further spread.
- Monitor all persons involved in the spill and the cleaning.
- Decontaminate all areas/equipment impacted by the spill. See **Decontamination of Facilities/Equipment** below.
- Make note of the spill in survey records. Perform and document contamination surveys to demonstrate successful decontamination.

Contact the Radiation Safety Officer (RSO) at 402.472.4925 for assistance as necessary.

For **major spills**, perform the following:



- Follow the **Minor Spills** section and perform the additional following steps.
- Notify all persons **NOT** involved in the spill to vacate the area.
- Restrict entrance until the RSO or their designee is on site and takes charge.
- Contact the RSO immediately at 402.472.4925 or after hours, the University Police Department at 402.472.2222.
- Take immediate steps to monitor and decontaminate involved personnel.
- Prepare a record of the cause of the accident and names of personnel involved.

Radiation Accident and Personnel Decontamination Procedures

Contact the RSO at 402.472.4925 (after hours, contact the University Police Department at 402.472.2222) if any of the following has occurred: (1) contamination of the skin; (2) an incident or exposure with a radiation producing device; (3) and/or cases of injury. If an individual requires medical attention, contact emergency responders at 911 first, then the RSO.

If possible, contaminated clothing should be carefully removed and placed in an appropriate radioactive waste container. Do not hesitate to initiate skin decontamination. Skin decontamination is performed by progressive cleansing of the contaminated location using mild cleaning agents such as soap and water. Use warm water when performing skin decontamination. Do not use hot or cold water for skin decontamination.

Decontamination is monitored using a survey instrument or swipe survey as appropriate. The skin decontamination end point determined by the RSO is reached when:

- No further decrease in contamination is achieved through repeated cleansing.
- Contamination is considered low enough to no longer be a significant hazard.
- Further decontamination would be more harmful than helpful.

For radiation producing devices, follow the device-specific emergency procedures.

Decontamination of Facilities/Equipment Used with Radioactive Materials

Typically, areas contaminated with radioactive materials can be decontaminated using household cleaners. Preparations for decontamination should begin promptly when contamination is discovered. Decontamination procedures should begin with cleaning the area of least contamination, progressing to the area of greatest contamination. A survey meter (or swipe survey, as appropriate) should be utilized throughout the cleaning process to monitor progress of decontamination. All cleaning materials should be disposed as radioactive waste.

Conduct a contamination survey when the area has been adequately cleaned. Repeat cleaning as necessary until contamination levels are less than the action level. Action levels are determined based on the radioisotopes used. If decontamination cannot be reduced below the appropriate action level, contact the RSO. See the EHS SOP, **Contamination Surveys for Radioactive Material Laboratories** and **Radiation Survey Meter Use** for additional information on action levels, documentation, and survey meter use.

NOTE: Spills of radioactive materials outside of rooms/locations not explicitly approved by the RSC will require additional decontamination as directed by the RSO.