

**GUIDELINES FOR HANDLING  
RADIOACTIVE SPILLS**

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1.0 **PURPOSE**

To provide guidelines for the protection of personnel and for containment and minimization of spills of radioactive material.

2.0 **SCOPE**

This procedure is applicable to both major and minor spills of radioactive material on the Georgia Institute of Technology (Georgia Tech) campus, including the Neely Nuclear Research Center (NNRC).

3.0 **RESPONSIBILITIES**

3.1 It is the responsibility of all Authorized Users (AU) and their staffs to comply with the provisions of this procedure in case of spills of radioactive materials.

3.2 It is the responsibility of the Office of Radiological Safety (ORS) to minimize radiation exposure as well as the spread of contamination. The Radiation Safety Officer (RSO) shall review the circumstances surrounding a spill of radioactive material and the proposed corrective action to prevent recurrence of such spills.

4.0 **REFERENCES/REQUIREMENTS**

4.1 **Requirements and Specifications**

4.1.1 10 CFR 20, Standards for Protection Against Radiation

4.1.2 State of Georgia Rules and Regulations for Radioactive Materials, Chapter 391-3-17.

4.2 **Related Procedures**

4.2.1 Procedure 9038, Bioassay Program

4.2.2 Procedure 9250, Facilities Contamination Surveys

4.2.3 Procedure 9302, Protective Clothing Requirements

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4.2.4 Procedure 9308, Airborne Radioactivity Surveys

4.2.5 Procedure 6010, General Rules and Guides for Handling Emergencies

4.2.6 Procedure 9306, Preparation and Maintenance of Radiation Work Permits

4.3 **Equipment/Materials Required**

4.3.1 Spill Response Kit

4.3.2 Geiger-Mueller (GM) and Ionization Chamber survey meters

4.4 **Others**

4.4.1 None

5.0 **PROCEDURAL STEPS**

5.1 **Definitions**

5.1.1 **Minor (Small) Spills**

5.1.1.1 Minor spills are spills involving a single laboratory, no personnel contamination, and less than 1.0 mCi of radioactivity.

5.1.2 **Major (Large) Spills**

5.1.2.1 Major spills are spills which involve any personnel contamination, radioactivity greater than 1.0 mCi, locations outside approved work areas, or direct radiation exposure levels greater than 2 mR/hr.

5.2 **Procedure**

5.2.1 **Managing Minor (Small) Spills**

5.2.1.1 When an accident occurs and radioactive material is loosed from its container, the first action that should be taken is to isolate the spill. This can be accomplished by using barriers or by simply directing personnel traffic away from the spill.

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- 5.2.1.2 Call the Office of Radiological Safety (ORS) immediately at 4-3605. Unless instructed to take action by the ORS, do nothing until personnel from the ORS arrive to evaluate the situation and to establish a plan for cleanup.
- 5.2.1.3 At low levels of contamination (< 50,000 dpm beta/gamma radiation), the Authorized User and his/her staff will normally clean the spill under the direction and supervision of the ORS.
- 5.2.1.4 Personnel will be monitored for contamination. If personnel are found to be contaminated, decontamination by the ORS will take place immediately.
- 5.2.1.5 If the potential exists for personnel intake either by inhalation (loose powder or vapor becomes airborne), ingestion (inadvertent intake by mouth) or injection (wound), the Radiation Safety Officer shall evaluate the situation and shall require bioassay samples as are appropriate and as are required by Procedure 9038.
- 5.2.1.6 Radioactive waste generated as a result of spill cleanup shall be sent for disposal as directed by the ORS.
- 5.2.1.7 The Authorized User responsible for the laboratory shall investigate the event and prepare a written report delineating the cause of the event, the corrective action that will be taken to preclude recurrence, and a statement of the time at which the corrective action shall be complete. The report shall be sent to the Radiation Safety Officer within ten working days after the event.
- 5.2.2 **Managing Large Spills**
- NOTE:** The priorities at any emergency at Georgia Tech are:
- 1) Protecting the safety and welfare of the public;
  - 2) Life saving and minimizing harm to personnel;
  - 3) Minimizing damage of and to the physical facility.
- 5.2.2.1 When a radioactive spill occurs or is suspected, the first step is the same as above in Step 5.2.1.1, contain and isolate the spill to prevent possible spread of the contamination.
- 5.2.2.2 Notify the Office of Radiological Safety immediately at (404) 894-3605.

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- 5.2.2.3 If a person is suspected of being contaminated, that individual shall remain in the general area where the spill occurred and attempt to minimize radiation exposure to himself and the potential for spread of the contamination. In this situation, the individual shall, if at all possible, request another individual to notify the Office of Radiological Safety.
- 5.2.2.4 The Radiation Safety Officer shall develop a plan to handle the emergency situation. The plan shall include the following elements:
- 5.2.2.4.1 The medical and personal needs of the person(s) who may be contaminated;
- 5.2.2.4.2 Decontamination of the individual(s) involved as appropriate;
- 5.2.2.4.3 Surveys to determine the extent of contamination may include dose rate surveys, contamination level surveys and airborne radioactivity surveys, as needed;
- 5.2.2.4.4 Immediate action to eliminate any contamination that may have exited the spill location; and
- 5.2.2.4.5 Based on survey data, develop a plan for restoring the facility to normal operation. A Radiation Work Permit (See Procedure 9306) is required for controlling the decontamination work if contamination is greater than 50,000 dpm/100 cm<sup>2</sup>.
- 5.2.2.5 **Evaluating Personnel Exposures to Spills**
- 5.2.2.5.1 Personnel exposures due to spills of radioactive material shall be evaluated and shall, as appropriate, include the following:
- 5.2.2.5.1.1 Whole body and skin dose resulting from the contamination;
- 5.2.2.5.1.2 Potential for internal intakes by any route as described in Procedure 9038; and
- 5.2.2.5.1.3 Bioassay analyses as appropriate.
- 5.2.2.6 **Reportability**
- 5.2.2.6.1 A determination shall be made of the potential reportability of the incident based on the requirements contained in GA 391-3-17.03 (14)(b) or (c). The Radiation Safety Officer shall make this decision.
- 5.2.2.6.2 The Radiation Safety Committee shall be informed of all incidents.

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6.0 **RECORDS**

- 6.1 At the conclusion of the decontamination, a report shall be initiated which describes the event, the cleanup action taken, the results, any necessary continuing action, assessment of personnel exposures involved, and corrective action to preclude recurrence.
- 6.2 For those individuals deemed to have accrued significant dose during the exposure event or cleanup of the event, appropriate amendments shall be made to these individuals personal dosimetry records.
- 6.3 Records generated as a result of implementation of this procedure shall be maintained for the life of the facility.

7.0 **BASIS**

This procedure outlines the steps to be taken in case of a spill involving radioactive materials. While precautions are taken to avoid spills, they are inevitable and it is prudent to be prepared to handle these situations.