

13 Incident Investigation and Follow-up

13.1 REPORTING INCIDENTS AND CONCERNS

Procedures must be in place in order to obtain information, or allow the reporting of emergency situations, accidents or hazardous situations. Radiation safety personnel should be available to respond to these situations 24 hours a day. All emergency situations, accidents, hazardous situations or extraordinary events that are not typical of the day to day operations or established department procedures must be reported to the Radiation Safety Officer. While an incident may not seem important to the department, it may be a reportable incident under the regulations. All institutions must be made aware of all incidents to maintain the integrity of the radiation safety program.

Emergency Situations Involving Radioactive Material

These situations may require an immediate response by the Radiation Safety Officer. They include but are not limited to:

- Damaged shipments
- Major Radioactive spills
These spills would be classified as major:
 - a) When a spill involves **breakage of storage vial** or **contents spilled from vial or syringe**
 - b) When a spill involves any radioisotope of **very high radiotoxicity**
 - c) When a spill involves release of **volatile material**
 - d) When it is suspected that **inaccessible areas** are contaminated
 - e) When reasonable efforts to decontaminate are not successful
 - f) When there is any doubt about appropriate decontamination procedures
 - g) If personal contamination and/or injury has occurred
 - h) Any rupture or suspected rupture of a sealed source
- Patients being treated with radiation who require emergency care
- Fires or explosions

Detailed information on the cleanup of a radioactive spill is covered in *Section 82 "Radioactive Spills and Decontamination"*.

The hospital telecommunications department should have a 24 hour 'Radiation Safety Emergencies Contact List' consisting of radiation safety officers, medical physicists and physicians who can offer advice and respond in emergency situations.

Accidents, or extraordinary events

Events can occur that are deemed extraordinary and not typical of the day to day operations or established department procedures. These events, while not considered immediate emergencies, have the potential to jeopardize the integrity of the radiation safety program. The Radiation Safety Officer must be promptly notified should these situations arise. They include but are not limited to:

- high external exposures
- lost sources
- minor spills readily handled by department personnel
- discrepancies noted in radioactive shipments

- medical misadministration of radioactive material (also risk management notification)
- equipment device failures
- any situation where you are unsure of the protocol
- implementation of procedures not currently established.

Hazardous Situations

Workplace radiation safety hazards are situations that do not pose an immediate safety violation, are a concern for the staff, or require clarification regarding established regulations. These situations should not require an immediate response. The hospital should have a mechanism for all staff to report safety concerns in any area. Radiation safety concerns can also be reported through this avenue.

- Reporting should first go through a department supervisor. If the situation is not resolved staff should use the hospital reporting procedure (QEII procedure is to call SAFE (7233))
- Work Related Injury and Illness
- Accidents and Close Calls (Remember not all accidents result in an Injury or Illness)
- Workplace Safety Hazards and Concerns: Staff encountering workplace radiation safety hazards are required to immediately notify the person in charge and start actions to resolve the hazard. If the hazard is not corrected, staff must call **SAFE (7233)**.

General Questions

General questions on any radiation safety issue can be directed to the Radiation Safety Office.

- Questions about radiation safety in your workplace
- Using personal protective equipment
- Information, videos or educational materials on any radiation safety issue

Reportable Incidents to Canadian Nuclear Safety Commission (CNSC)

Not all incidents are required to be reported to the regulatory agencies. Many incidents are to be investigated as part of the radiation safety program and records kept on file for inspection.

The CNSC require notification for the following:

Radiation Safety Program Section	Incident	Time Frame to Report
18 Sealed Sources	Leak test results in excess of 200 Bq	immediately
62 Receiving and 63 Transport	Damaged or Leaking Packages Lost shipments Radiation Levels >2 mSv/hr surface	immediately with follow up investigation report in 21 days
73 Personnel Monitoring	Nuclear Energy Worker Whole Body Dose > 50 mSv Nuclear Energy Worker Extremity Dose > 500 mSv Nuclear Energy Worker Eye Dose > 150 mSv Nuclear Energy Worker Pregnancy Dose > 4 mSv General Public Limits Whole body dose > 1 mSv General Public Limits Extremity Dose > 50 mSv General Public Limits Eye Dose > 15 mSv	immediately with follow up investigation report in 21 days
74 Bioassay	Thyroid screen >10kBq	immediate report with follow up bioassay
92 Radiation Emitting Devices	lost source or stuck source surface reading > 2mSv/hr when in shielded position	immediately with follow up investigation report in 21 days

13.2 INCIDENT RESPONSE BY RADIATION SAFETY OFFICER

The radiation safety officer must investigate all radiological incidents in a thorough and consistent manner. Investigations must be performed expeditiously to mitigate the consequences of the incident, determine root cause and contributing factors, and identify appropriate corrective actions. Root cause analysis should be conducted concurrently with mitigation of the event. If the cause cannot be determined immediately, it may be necessary to terminate certain activities or to close an entire laboratory until the cause can be determined. The appropriate responsible user or department should be involved in the investigation. The Radiation Safety Committee and senior management should be informed as soon as practicable and before notifying a regulator regarding any reportable incidents. A summary of the investigations should be reported to the Radiation Safety Committee at the quarterly meetings.

Radiation Safety Officer Response

1. Management of the incident to include:
 - Immediate assessment of the magnitude of the event based on initial, limited information.
 - Taking steps to terminate, control, or limit the effects.
 - Conduct decontamination activities to control immediate and residual effects of the incident.
2. Determine whether a report may be required by the regulatory agency.
 - Notify hospital management or public relations prior to reporting the incident to a regulator. Inform them of the incident and alert them to the report. Leadership prefers hearing about the incident from the Radiation Safety Officer rather than from a regulator or a member of the media.
 - Notify the regulatory agency in a timely manner. Some reportable incidents have strict time frames for reporting.
 - Incident may be reportable before all facts are known.
 - Certain information such as names and social insurance numbers may be considered confidential. The agency will have a procedure for accommodating confidential information.
3. Thoroughly investigate the incident to confirm initial information and collect additional information to include:
 - Interviewing all persons involved in the incident.
 - Determine the sequence of events, amount of radioactive material involved, radiation dose and its associated hazard, any unintended radiation exposure of occupational workers and members of the public.
 - Identifying the cause of the incident.
 - Performing independent radiation exposure rate surveys, contamination surveys, bioassays, dose assessments of radiation exposure to potentially affected individuals.
 - Reviewing any records associated with the incident.
4. Identify and implement corrective and preventive actions to prevent a reoccurrence of the incident
5. Document the incident.
6. Discuss major accidents with the Radiation Safety Committee and senior management and report all other incidents at regularly scheduled meetings.

Radiation Safety: Inquiry - Investigation - Follow-up						
Radiation Safety ID #	RSP-	Other Reference ID #		Completed On		
Licence #		Permit #		Radiation Program Section		
Occurrence Date				Received On		
Reportee Last Name			First Name		Phone	
Building		Floor		Room #		Department
Inquiry/Issue						

<u>Date</u>	<u>Content of Inquiry/Investigation/Follow-up (Date each entry)</u>					
Manager		Manager Phone		Director		
Other 1 Name		Other 1 Manager		Other 1 Manager Phone		
<u>Actions</u>				<u>Individual Responsible</u>		