Appendix F
Radiological Emergencies

Responding to a Radiological Emergency

1.1 General Safety Procedures to Handle Spills

Emergency phone numbers for Radiation Safety staff members are posted conspicuously in areas of use, so that they are readily available to workers in case of emergencies. SCA has area emergency equipment readily available for handling spills. Commonly available spill response materials include the following:

- Disposable gloves
- Disposable lab coats
- Disposable shoe covers
- Absorbent materials
- Plastic containment bags
- "Radioactive Material" labeling tape
- Decontamination solution
- Box of Wipes
- Instructions for "Emergency Procedures"
- Hazard communication signage
- Appropriate survey instruments including batteries (for survey meters)

1.2 Minor Spills of Liquids and Solids

Instructions to Workers:

1. Stop the spill and prevent the spread of contamination by covering the spill with absorbent paper. (Paper should be dampened if solids are spilled).
2. Warn others in the area that a spill has occurred.
3. Isolate the area so as not to spread contamination. Use radiation symbol tape or ribbon if possible; use any physical barrier like chairs or tables if radiation symbol tape is not available.
4. Monitor for skin and clothing contamination.
5. Survey and cleanup the contaminated area. Do not forget to wear your dosimeter (if necessary) or the proper protective equipment: gloves, laboratory coat, eye protection and disposable shoe coverings (if necessary) before attempting to clean the spill. Mark the perimeter of the spill and isolated spots. Thoroughly clean by wiping the contamination with absorbent paper, working from the perimeter towards the center of the spill.
6. Carefully fold the absorbent paper with the clean side out and place in a plastic bag for transfer to a radioactive waste container. Put contaminated gloves and any other contaminated disposable material in the bag.
7. Once finished with the decontamination, survey the area with an appropriate low-range radiation detector survey meter or other appropriate technique. Check the area around the spill for contamination. Also recheck hands, face, clothing, and shoes for contamination.
8. Report the incident to the Radiation Safety Officer (RSO) promptly.
9. Allow no one to return to work in the area unless approved by the RSO.

10. Cooperate with RSO/Radiation Safety staff (e.g., investigation of root cause, provision of requested bioassay samples, following decontamination techniques, surveys, requested documentation).

Duties for the RSO:

1. Follow up on the decontamination activities and document the results.
2. As appropriate, determine cause and corrective actions needed; consider bioassays if licensed material may have been ingested, inhaled, and/or absorbed through the skin.
3. If necessary, notify the State of Maryland.

1.3 Major Spills of Liquids And Solids

Major spills are defined as any accident involving radioactive materials resulting in one or more of the following situations:

(1) Radioactive material greater than or equal to one millicurie is involved;
(2) Radioactive liquids greater than one liter are involved;
(3) Any personal contamination;
(4) Any contamination in unrestricted areas;
(5) Multiple findings of contamination within a restricted area.

Instructions to Workers:

1. Clear the area.
2. If appropriate, survey all persons not involved in the spill and vacate the room.
3. Prevent the spread of contamination by covering the spill with absorbent paper (paper should be dampened if solids are spilled), but do not attempt to clean it up.
4. To prevent the spread of contamination, limit the movement of all personnel who may be contaminated.
5. Shield the source only if it can be done without further contamination or significant increase in radiation exposure.
6. Close the room and lock or otherwise secure the area to prevent entry.
7. Post the room with a sign to warn anyone trying to enter that a spill of radioactive material has occurred.
8. Notify the Radiation Safety Officer (RSO) immediately.
9. Survey all personnel who could possibly have been contaminated.
10. Decontaminate personnel by removing contaminated clothing and flushing contaminated skin with lukewarm water and then washing with a mild soap.
11. Allow no one to return to work in the area unless approved by the RSO.
12. Cooperate with RSO/Radiation Safety staff (e.g., investigation of root cause, provision of requested bioassay samples).
13. Follow the instructions of the RSO/Radiation Safety staff (e.g., decontamination techniques, surveys, provision of bioassay samples, requested documentation).

Duties for the RSO:

1. Confirm decontamination of personnel. 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.
2. Supervise decontamination activities and document the results. Documentation should include location of surveys and decontamination results.
3. Determine cause and corrective actions needed;
4. Consider need for bioassays if licensed material may have been ingested, inhaled, and/or absorbed through the skin.
5. If necessary, notify the State of Maryland.

1.4 Incidents Involving Radioactive Dust

Instructions to Workers:

1. Notify all personnel to vacate the room immediately.
2. Shut down ventilation system, if appropriate, to prevent the spread of contamination throughout system and other parts of facility.
3. Vacate the room. Seal the area, if possible.
4. Notify the Radiation Safety Officer (RSO) immediately.
5. Ensure that all access doors to the area are closed and posted with radiation warning signs, or post guards (trained) at all access doors to prevent accidental opening of the doors or entry to the area.
6. Survey all persons who could have possibly been contaminated.
7. Decontaminate as directed by the RSO.
8. Promptly report suspected inhalations and ingestions of licensed material to the RSO.
9. Decontaminate the area only when advised and/or supervised by the RSO.
10. Allow no one to return to work in the area unless approved by the RSO.
11. Cooperate with the RSO/Radiation Safety staff (e.g., investigation of root cause, provision of requested bioassay samples).
12. Follow the instructions of the RSO/Radiation Safety staff (e.g., decontamination techniques, surveys, provision and collection of bioassay samples, and requested documentation).

Duties for the RSO:

1. Supervise decontamination activities.
2. Perform air sample surveys in the area before permitting resumption of work with licensed materials
3. Provide written directions to potentially contaminated individuals about providing and collecting urine, breath, blood, or fecal samples, etc.
4. Consider need for medical exam and/or whole body count before permitting involved individuals to return to work with licensed material.
5. Determine cause and corrective actions needed; consider need for bioassays if licensed material may have been ingested, inhaled, and/or absorbed through the skin.
6. Document incident.
7. If necessary, notify the State of Maryland.

1.5 Minor Fires

Instructions to Workers:

1. Immediately attempt to put out the fire by approved methods (i.e., fire extinguisher) if other fire hazards or radiation hazards are not present.

2. Notify all persons present to vacate the area and have one individual immediately call the Radiation Safety Officer (RSO) and fire department (as instructed by RSO).
3. Once the fire is out, isolate the area to prevent the spread of possible contamination.
4. Survey all persons involved in combating the fire for possible contamination.
5. Decontaminate personnel by removing contaminated clothing and flushing contaminated skin with lukewarm water, then washing with a mild soap.
6. In consultation with the RSO, determine a plan of decontamination and the types of protective devices and survey equipment that will be necessary to decontaminate the area.
7. Allow no one to return to work in the area unless approved by the RSO. Cooperate with the RSO/Radiation Safety staff (e.g., investigation of root cause, provision of requested bioassay samples).
8. Follow the instructions of the RSO/Radiation Safety staff (e.g., decontamination techniques, surveys, provision of bioassay samples, and requested documentation).

Duties for the RSO:

1. Supervise decontamination activities. 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.
2. Consult with fire safety officials to assure that there are no other possibilities of another fire starting.
3. Determine cause and corrective actions needed; consider need for bioassays if licensed material may have been ingested, inhaled, and/or absorbed through the skin.
4. Document the incident.
5. If necessary, notify the State of Maryland.

1.6 Fires, Explosions, or Major Emergencies

Instructions to Workers:

1. Notify all persons in the area to leave immediately.
2. Call 911.
3. Notify the Radiation Safety Officer and other facility safety personnel.
4. Upon arrival of firefighters, inform them where radioactive materials are stored or where radioisotopes were being used.
5. Inform them of the present location of the licensed material and the best possible entrance route to the radiation area, as well as any precautions to avoid exposure or risk of creating radioactive contamination by use of high pressure water, etc.
6. Cooperate with the RSO/Radiation Safety staff (e.g., investigation of root cause, provision of requested bioassay samples).
7. Allow no one to return to work in the area unless approved by the RSO.
8. Follow the instructions of the RSO/Radiation Safety staff (e.g., decontamination techniques, surveys, provision of bioassay samples, and requested documentation).

Duties for the RSO:

1. Coordinate activities with Facilities Management, Environmental Health & Safety, and with local fire department.

2. Consult with the firefighting personnel and set up a controlled area where the firefighters can be surveyed for contamination of their protective clothing and equipment after the fire is extinguished.
3. Once the fire is extinguished, do not allow the firefighters to enter the radiation area until a thorough evaluation and survey are performed to determine the extent of the damage to the licensed material use and storage areas.
4. Perform thorough contamination surveys of the firefighters and their equipment before they leave the controlled area and decontaminate, if necessary.
5. Supervise decontamination activities.
6. Consider bioassays if licensed material may have been ingested, inhaled, and/or absorbed through the skin.
7. Document the incident.
8. If necessary, notify the State of Maryland.

PROTECTIVE ACTION GUIDES

I. INITIAL RESPONSE ACTIONS

A. The following steps are to be followed at the earliest possible time by those individuals first arriving or already at the scene of the radiological incident. These steps are given as guidance for First Responders who may not be thoroughly trained in response to radiological incidents. Those First Responders arriving at the scene have primary responsibility to carry out the items listed below.

1. Call 911 as soon as possible and describe the radiological nature of the incident.

2. Wear protective clothing, if available.

3. Restrict the area of the incident.

   a. Keep the public as far as possible from the incident scene and any associated debris.

   b. Keep upwind of the incident, especially where fire is present.

   c. The area downwind of the fire, especially if smoke and ash are involved, should be cleared of people, even if these are residents.

4. Perform life-saving rescues and emergency first aid.

   a. Remove injured persons as far away as practical from the incident scene, especially in case of fire.

   b. If medical attention is indicated, assist in arrangements for medical assistance. The medical personnel should be informed that radioactive contamination might exist on the victims and/or their clothing.

5. Identify the hazard. If possible, obtain:

   a. Current Semi-Annual Radioisotope Inventory Report,

   b. Radioactive Shipment Receipt Report for involved isotope(s),

   c. Any other information available from users of the radioactive material(s).

6. If there is a fire or danger of fire, call 911. Fire personnel should be cautioned that radioactive materials are involved.

7. Keep to an absolute minimum, any contact with radioactive material and suspected contaminated material.

a. If work connected with rescue or fire fighting must be done in the incident area, handle the debris resulting from an incident with mechanical means to avoid contact with clothing.

b. Clothing and tools used at the scene should remain until they have been checked for contamination by the RSO.

c. Do not attempt to move or cleanup any material involved.

8. Detain all persons

a. Identify all persons who may have been exposed to a possible release of radioactive materials.

b. Detain all persons involved with the incident or potentially contaminated by the incident at the scene, except those requiring emergency medical evacuation.

c. Individuals will be monitored, decontaminated if necessary, and cleared after further medical treatment and released.

d. Record names, addresses, destinations, and telephone numbers from those individuals who cannot be persuaded to stay at the incident scene.

9. Prohibit eating, drinking, or smoking in the incident area.

B. It is important to remember that only essential activities are carried out in proximity to the incident prior to the arrival of, or consultation with qualified radiological health professionals.

SCA
Radiation Unintended Exposure/Incident Report

Evaluation of exposure incident to be done by RSO within 72 hours

1. Employee Name: _____

2. Date of Incident: _____

3. Description of employee's activities during the exposure incident: _____

_____

_____

_____

4. The source of exposure was:

   a. system _____

   b. location _____

   c. operator _____

   d. duration _____

   e. other _____

   _____

5. Describe the circumstances under which the exposure incident occurred: _____

   _____

   _____

   _____

6. Can repetition of the exposure incident be minimized by instituting a new engineering or work procedure control: YES _____ NO _____

7. If the answer to item 7 is yes, describe the remedial action which should be taken in the future: _____

_____

_____

_____

Date this action was instituted: _____

RSO Signature: _____