

Western Michigan University

Radiation Safety

Emergency Plan

Purpose

- A. Provide Immediate and recovery actions for mitigating radiological emergencies to minimize exposure to the General Public, WMU Authorized Users, and Radiation Workers.

- B. Describe the responsibilities for emergency response in order to minimize confusion, inappropriate or false communication, and to ensure all emergencies are handled promptly and professionally.

Table of Contents

Section	Title	Page
I.	Responsibilities	1
II.	Definitions	2
III.	Requirements	2
IV.	Final Conditions	3

Appendix

- A. Radiation Safety Emergency Contacts
- B. Contaminated Injured Person
- C. Loss of Contamination Control – Spills or Levels > 1000 dpm/100 cm²
- D. Loss or Theft of Radioactive Material
- E. Fire Involving Radioactive Material
- F. Overexposure or Abnormal Readings on Personnel Dosimeters

I. Responsibilities

A. Executive Manager

1. Make prompt decisions without having to consult with higher management to mitigate or respond to emergencies or abnormal conditions. **[NUREG 1556 Vol 11 / License]**
2. Apportion the necessary resources to provide immediate and recovery actions for emergencies or incidents. **[License]**
3. Allocate the necessary resources to investigate, correct, and prevent the recurrence of incidents or emergencies involving radiation or radiation producing machines. **[License]**
4. Review notification to outside agencies.
5. Make all required notification to outside agencies if the Radiation Safety Officer is unavailable or incapacitated. **[Quality Control Program]**
6. Maintain the overall control of personnel and activities during the initial and immediate recovery phases of events involving radiation or radiation producing machines.

B. Radiation Safety Officer (RSO)

1. Carry out or verify all immediate actions have been completed.
2. Act as On-Scene Leader, direct the actions of individuals assigned to assist in the initial response and recovery phases of the emergency.
3. Make all required notifications to outside agencies. **[Quality Control Program]**
4. Investigate, correct, and implement actions to prevent the recurrence of incidents or emergencies involving radiation or radiation producing machines. **[Quality Control Program]**
5. Ensure the event and all actions are correctly documented. **[Quality Control Program]**

C. Authorized User (AUs)

1. Assist the RSO and Radiation Workers as needed.
2. Complete or direct the completion of the immediate actions until relieved by the RSO.
3. Notify the RSO of all emergencies or abnormal conditions that could lead to an emergency.
4. Provide guidance for any additional hazards that may be encountered in their labs during the initial and recovery phases of an event.
5. Ensure the Radiation Workers under their supervision are aware of their responsibilities under this plan.
6. Initiate the documentation of discovered emergencies or abnormal conditions. **[Quality Control Program]**

D. Radiation Workers (RWs)

1. Identify emergencies, abnormal conditions, or deviations from the rules, regulations, practices, or policies that govern the use or radiation or radiation producing machines. **[Quality Control Program]**
2. Initiate immediate actions when discovering an emergency or abnormal condition.
3. Provide assistance as directed by the AU or RSO.
4. Notify the RSO and AU of an emergency, abnormal conditions, or deviations from the rules, regulations, practices, or policies that govern the use or radiation or radiation producing machines.

5. Initiate the documentation of discovered emergencies or abnormal conditions. **[Quality Control Program]**

E. Division of Environmental, Health, and Safety

1. Provide 24 hour emergency telephone coverage.
2. Assist the RSO as needed in the initial and recovery phases of an emergency.
3. Act as the On-Scene leader until the RSO arrives, is briefed, and assumes the responsibilities of the On-Scene Leader.
4. Make all notification to outside agencies, IF the RSO (primary) AND the Executive Manager (secondary) are unavailable or incapacitated. **[Quality Control Program]**

F. On-Scene Leader

1. Direct the actions necessary to stabilize the conditions that caused the emergency.
2. Liaison with Emergency Response Units, such as the Fire Department, Police Department, State Department, etc.
3. Brief the RSO prior to relinquishing responsibilities:
 - a. Current conditions.
 - b. The actions that have been taken.
 - c. The actions currently in progress.
 - d. Suspected cause of the emergency.
 - e. Number of people involved, including any injuries.
 - f. Radiological conditions if known.
4. Assist the RSO in documenting the event and all actions that were taken during the emergency. (Quality Control Program)

II. Definitions - NONE

III. Requirements [10CFR19.12]

A. Notify the RSO and AU as soon as possible upon the discovery of an abnormal or emergency condition.

B. Document on an Incident Report all emergencies, abnormal conditions and deviations from the rules, regulations, practices or policies that govern the use or radiation or radiation producing machines. **[Quality Control Program]**

C. Notifications required by the NRC and/or the State will be made by:

1. Radiation Safety Officer
2. Executive Manager
3. Division of Environmental, Health, and Safety

D. The NRC and State require a written follow up report within thirty days of a telephone notification. **[10CFR20.2202 / 333.5087 / Administrative Controls Program]**

IV. Final Conditions

- A. The emergency has been stabilized; all immediate and recovery actions have been completed.

- B. All required NRC and State notifications have been made, including required follow up reports.

- C. The event has been documented in accordance with the Quality Control Program.

- D. The documentation is maintained in accordance with the Administrative Controls Program.

Appendix A Radiation Safety Emergency Contacts

**In cases of
FIRE and LIFE THREATENING MEDICAL CONDITIONS
CALL 911 IMMEDIATELY**

All other radiation safety emergencies call the RSO first.

Radiation Safety Officer	WMU #	Cell	Home
Mr. Jim Center	387 - 5933	269 - 744 - 0996	269 - 342 - 4040

1. Contact the Radiation Safety Officer (RSO) in a radiation safety emergency. The RSO will be available 24 hours a day / 7 days a week.
2. Home telephone numbers have been provided for emergencies.
3. **If you do not talk directly with the RSO, it is important to leave your call back number and a detailed message regarding the radiation safety emergency.**
4. **If you are unable to speak directly to the RSO, continue down the list calling until you speak with someone.**
5. If you **do not** talk directly with a person, it is important to **leave your call back number** and a **detailed message** regarding the radiation safety emergency.

Name	WMU #	After Hours
Dr. Karim Essani, Former Radiation Safety Officer	387 - 5636	269 – 377 - 7892
Dr. Sherine Obare, Executive Manager	387 - 8294	410 – 960 - 7716
Office of Vice President for Research (during normal business hours)	387-8298	N/A
Environmental, Health, and Safety	387 - 5590	387 - 5555
WMU Police Department	911	911

Appendix B Contaminated Injured Person

NOTE: The victims medical needs **ALWAYS** take precedence over the potential radiation and/or contamination hazards.

I. Immediate Actions

- A. Provide necessary First Aid.

- B. Call 911 or direct someone to call 911 to report the emergency.
 - 1. Answer their questions.
 - 2. Notify them the victim may be contaminated.
 - 3. Follow the guidance from the 911 operator.

- C. Notify the RSO or ask someone in the area or the 911 dispatcher.

- D. Reassess the area for hazards that may affect the treatment or involvement of responders.

- E. Provide the Medical Responders with shoe covers if possible.

- F. Provide the Medical Responders with as much information as you can.
 - 1. Known medical conditions.
 - 2. Known Hazards, including the radiological concerns.
 - 3. That once the victim's medical condition is stabilized you would like to perform the remainder of the Immediate Actions.

- G. Perform the following **ONLY** with the consent of the Emergency Medical Responders.
 - 1. Perform a direct frisk of the victim when the medical attention allows.
 - 2. Determine the extent of contamination on and around the victim.
 - 3. Take actions to prevent or minimize the spread of contamination during the transport to the emergency medical care facility.

- H. Remove the shoe covers from the Medical responders.

- I. Record where the victim is being taken.

- J. Secure the area.

II. Recovery Actions

- A. RSO recommends or makes additional notifications.
- B. RSO reports to the emergency medical facility where the victim was taken.
 - 1. Survey the vehicle, the area, the equipment, and the personnel that may have been involved in the handling of the victim or equipment that could have become contaminated.
 - 2. Evaluate the survey results.
 - 3. Decontaminate as necessary.
 - 4. Free Release or confiscate materials and equipment as necessary.
 - 5. Document all survey results, the names and social security numbers of personnel involved in the response to the emergency.
 - 6. Return any material that was confiscated to WMU for storage or disposal.
- C. Survey of the area the victim was working and all areas where movement occurred in the transportation of the victim to determine best course of action for recovery.
- D. Decontaminate the area using approved practices.
- E. Collect and monitor all waste being generated in the recovery of the area.
- F. Survey the area.
 - 1. If the area is less than 1000 dpm/100 cm², proceed with next step.
 - 2. If the survey indicates contamination levels \geq 1000 dpm/100 cm², continue to decontaminate the area until the area is < 1000 dpm/100 cm².
- G. Document the event on Incident Report. **[Quality Control Program]**
- H. Investigate the cause of the injury and loss of contamination control.
 - 1. Include in the investigation: human factors, mechanical failures, etc.
 - 2. The investigation is complete when the investigator has documented measures that should prevent or minimize recurrence.
- I. Complete the Incident Report after the investigation and preventive actions, if necessary.
- J. File all documents.

Appendix C

Loss of Contamination Control – Spills or Levels > 1000 dpm/ 100 cm²

I. Immediate Actions

- A. Stop the spill or spread of contamination. If you are wearing gloves upright the bottle or the container and / or cover the source with an absorbent material.
- B. Warn others in the area. Any person in the area could help you and the recovery of the area by performing some of the steps as directed by you if they know there is an emergency.
- C. Secure the area. Do not let any other personnel into the spill area. This will minimize the spread of contamination and prevent inadvertent exposure.
- D. Notify the RSO. Someone in the area could do this action for you.
 - 1. Location of the emergency.
 - 2. Source involved.
 - 3. Quantity involved.
 - 4. Any other information that will make the recovery from the incident easier and faster.
- E. Await further instructions.
- F. Minimize moving through the area.
- G. Remember where you went and what you touched while completing steps A-C.

II. Recovery Actions

- A. RSO determines and makes additional notifications.
- B. Survey the spill, movement, and surrounding areas to determine the best course of action for recovery.
- C. Decontaminate the area using approved practices.
- D. Collect and monitor all waste being generated in the recovery of the area.
- E. Survey the area.
 - 1. If the area is less than 1000 dpm/100 cm², proceed with next step.
 - 2. If the survey indicates contamination levels \geq 1000 dpm/100 cm², continue to decontaminate the area until the area is < 1000 dpm/100 cm².
- F. Document the event on Incident Report. **[Quality Control Program]**

- G. Investigate the cause of the loss of contamination control.
 - 1. Include in the investigation: human factors, mechanical failures, etc.
 - 2. The investigation is complete when the investigator has documented measures that should prevent or minimize recurrence.
- H. Complete the Incident Report after the investigation and preventive actions, if necessary.
- I. File all documents.

Appendix D

Loss or Theft of Radioactive Material

I. Immediate Actions

- A. Warn others in the area. Any person in the area could help you by performing some of the steps as directed by you if they know there is an emergency.
- B. Secure the area to prevent inadvertent exposure.
- C. Notify the RSO. Someone in the area could do this action for you
 - 1. Location of the emergency.
 - 2. Material involved.
 - 3. Quantity involved.
 - 4. Any other information that will make the recovery from the incident easier and faster.
- D. Conduct a thorough search of the area using a dose rate meter to assist in locating the material.
- E. Await further instructions.

II. Recovery Actions

- A. RSO determines and makes additional notifications.
- B. Expand the search area and conduct additional radiation surveys to locate the material.
- C. Document the event on Incident Report. **[Quality Control Program]**
- D. Investigate the cause of the loss of radioactive material.
 - 1. Include in the investigation: human factors, procedural failures, etc.
 - 2. The investigation is complete when the investigator has documented measures that should prevent or minimize recurrence.
- E. Complete the Incident Report after the investigation and preventive actions, if necessary.
- F. File all documents.

Appendix E

Fire Involving Radioactive Material or a Radiation Safety Room

I. Immediate Actions

- A. Evacuate all personnel.
- B. Call 911 or direct someone to call 911 to report the emergency.
 - 1. Answer their questions.
 - 2. Notify them the area may contain radioactive material.
 - 3. Follow the guidance from the 911 operator.
- C. Notify the RSO.
- D. Inform the firefighters when they arrive of:
 - 1. Known hazards, including the radiological concerns.
 - 2. Precautions to use to minimize exposure and contamination.
- E. Set up a control area to survey the exiting firefighters.
- F. Provide assistance as requested by the RSO or firefighters.

II. Recovery Actions

- A. RSO determines the need and makes additional notifications.
- B. Survey the firefighters and equipment.
 - 1. Evaluate the survey results.
 - 2. Decontaminate as necessary and practical.
 - 3. Free Release or confiscate materials and equipment as necessary.
 - 4. Document all survey results, the names and social security numbers of personnel involved in the response to the emergency.
- C. Survey the area to determine the best course of action for recovery.
- D. Decontaminate the area using approved practices.
- E. Collect and monitor all waste being generated in the recovery of the area.
- F. Survey the area.
 - 1. If the area is less than 1000 dpm/100 cm², proceed with next step.
 - 2. If the survey indicates contamination levels \geq 1000 dpm/100 cm², continue to decontaminate the area until the area is < 1000 dpm/100 cm².

- G. Document the event on Incident Report. **[Quality Control Program]**
- H. Investigate the cause of the loss of contamination control.
 - 1. Include in the investigation: human factors, mechanical failures, findings from the fire prevention professionals, etc.
 - 2. The investigation is complete when the investigator has documented measures that should prevent or minimize recurrence.
- I. Complete the Incident Report after the investigation and preventive actions, if necessary.
- J. File all documents.

Appendix F

Overexposure or Abnormal Readings on Personnel Dosimeters

I. Immediate Actions

- A. Contact the RSO, the affected individual, their supervisor, and the Executive Manager.
- B. Determine the area in which the individual was working.
- C. Secure the area to prevent inadvertent exposure.
- D. Perform a radiation survey of the area.
- E. Evaluate all information.

II. Recovery Actions

- A. RSO determines the need and makes additional notifications.
- B. Determine and assign dose to the affected individual.
- C. Document the event on Incident Report. **[Quality Control Program]**
- D. Investigate the cause of the overexposure or abnormal reading.
 - a. Include in the investigation: human factors, procedural failures, vendor quality, etc.
 - b. The investigation is complete when the investigator has documented measures that should prevent or minimize recurrence.
- E. Complete the Incident Report after the investigation and preventive actions, if necessary.
- F. File all documents.