The information contained in this document cannot be changed or modified in any way and should serve only the purpose of promoting exchange of experience, knowledge dissemination and training in nuclear safety.

The information presented does not necessarily reflect the views of the IAEA or the governments of IAEA Member States and as such is not an official record.

The IAEA makes no warranties, either express or implied, concerning the accuracy, completeness, reliability, or suitability of the information. Neither does it warrant that use of the information is free of any claims of copyright infringement.

The use of particular designations of countries or territories does not imply any judgment by the IAEA as to the legal status of such countries or territories, of their authorities and institutions or of the delimitation of their boundaries. The mention of names of specific companies or products (whether or not indicated as registered) does not imply any intention to infringe proprietary rights, nor should it be construed as an endorsement or recommendation on the part of the IAEA.
Radiological Emergencies

Emergency Management

Lecture
Introduction

- Emergency management means **overall strategic management** of emergency response

- Objective of this lecture is to present and explain requirements, concepts and functions of emergency management
Content

- Requirements for emergency management
- Emergency management role
- Emergency Manager’s tasks
- Emergency phase actions
- Post-emergency phase actions
- Summary
Why Emergency Management?

Risk

Consequence

Hazard source
Preparedness and Response for a Nuclear or Radiological Emergency

SAFETY REQUIREMENTS
Safety Standards Series No. GS-R-2

Jointly sponsored by
FAO, IAEA, ILO, OECD/NEA, OCHA, PAHO, WHO
Safety Requirements

- Safety requirements are divided into two groups
  - Requirements for response
  - Requirements for preparedness

- Requirements for emergency management represent only one part of a complete set
Response

- On-site emergency response shall be promptly executed
- Off-site emergency response shall be effectively managed
- Emergency response shall be coordinated between all responding organizations
- Information necessary for making decisions on allocation of resources shall be appraised throughout emergency
- Jurisdictions and response organizations that fall within PAZ or UPZ shall coordinate their emergency responses and shall provide mutual support
Preparedness

- Transition from normal to emergency operations shall be clearly defined and shall be effectively made without jeopardizing safety.
- Arrangements shall be made to coordinate emergency responses of all off-site response organizations with on-site response.
- Arrangements for radiation emergency shall be integrated with arrangements at national and local level for response to conventional emergencies.
Preparedness (1)

- Arrangements shall be made for implementation of command and control system for response to radiation emergency

- Arrangements shall be made for coordinating response to radiation emergency between response organizations and jurisdictions that fall within PAZ or UPZ
Practical Goals of Emergency Response

- To take mitigatory action at the scene
- To prevent occurrence of deterministic effects
- To render first aid and to manage treatment of radiation injuries
- To reduce occurrence of stochastic effects in population
- To limit occurrence of non-radiological effects
- To protect environment and property
- To prepare for resumption of normal social and economic activity
Important Aspects

- Most important aspects of managing radiation emergency
  - Ability to promptly and adequately determine actions to protect members of the public and emergency workers
  - Ability to take those actions efficiently
RESPONSE INITIATOR
First official being informed of an emergency with authority to initiate a response plan

EMERGENCY MANAGER
Appointed official in charge of overall emergency response

FIRST RESPONDER
First person or team to arrive at the scene of an accident with an official role to play in the accident response

ON-SCENE CONTROLLER
Usually senior member of First Responder team

RADIOLOGICAL ASSESSOR
Usually senior member of a radiological assessment team sent to the scene of an accident

Police
Fire service
Emergency medical responder
Facility responder

Radiological assessment teams and laboratories

---

IV2_2 Emergency Management
Emergency Manager

- Emergency Manager is in charge of the overall strategic emergency management
Role and Functions of the Emergency Manager

- Who is designated as Emergency Manager?
  - Document in the response plan

- Knowledge/skills required

- Operational location
Emergency Manager’s Tasks

- Interface with accident scene
Radiological and Non-radiological Hazards

- Be aware
  - Radiation may be just one of the hazards in an accident - most cases non-radiological hazards (e.g., fire, toxic fumes) will dominate
  - Radiological assessors will focus on the radiological aspects of the accident
Response Phases

- Emergency Phase
- Post-Emergency Phase
Initial Response
An Example

**NOTIFICATION of an emergency**

**RESPONSE INITIATOR**

- Receives notification, provides initial advice, initiates the response

**Radiation hazard?**

- **No**
  - Record details
  - STOP

- **Yes**
  - Activate EMERGENCY MANAGER
  - Manages accident assessment and mitigation - carries the ultimate responsibility for emergency response
Initial Response - Cont’d

Hazard level?

Low

Activate RADIOLOGICAL ASSESSOR

Re-assesses radiation hazards and performs recovery

Medium or high

Activate (if not yet activated) FIRST RESPONDER

Performs actions to mitigate the accident and implements protective and initial recovery actions

Designate ON-SCENE CONTROLLER

Manages all response actions at the scene of an accident

Activate RADIOLOGICAL ASSESSOR

Assesses radiation hazards and recommends protective actions and recovery and clean up operations
Emergency Phase

- Obtain briefing from **Response Initiator** or staff on-scene; alert/activate other responders
  - Initial Information
  - Accident Registry Form
  - Alerted Emergency Responders Form
Emergency Phase Actions

- Maintain a Log
  - What was done
  - When was it done
  - Notifications
  - Decisions

- Maintain status boards/displays
Emergency Phase Actions

- Assess situation and magnitude of potential radiological problem

  - **Examples:**
    - Calibration Sources - Low
    - Well Logging - Medium
    - Teletherapy - High
    - Moisture Detectors - ?
    - Industrial Radiography - ?
Emergency Phase Actions

- Identify type of emergency and evaluate necessary main actions

- Ensure all personal protection guides and actions are implemented in accordance with Radiological Assessor recommendations
Emergency Phase Actions

Additional Considerations

- Depending on the circumstances of the accident various command and staging facilities will need to be established at or near the scene.

- Examples:
  - Command post
  - Reception area for response personnel
  - Vehicle marshalling area
  - Media reception area
Safety perimeter at 100 μSv/h or safe distance

Inner cordon area

Outer cordon area

Access and contamination control point

Command post

Vehicle marshalling area

Reception area for response personnel

Media reception area

Decontamination area

Medical response base

Radiological Assessor base

Access control point

wind
Emergency Radiological Monitoring

- To obtain the data or information required in an emergency
  - Different type of measurements can be performed
  - Different physical quantities can be measured

- The intended uses of the results should guide the choice of monitoring priorities
Emergency Phase Actions

- Ensure on-scene personnel are aware of media response, make media arrangements; appoint press liaison, if necessary
Additional Considerations

- Public Information
- Media Interest/Response/Relations
Post Emergency Phase

- Obtain dose assessment from Radiological Assessor, ensure medical follow-up of persons sent to hospital(s), inform media/public, response organizations that emergency is under control
- Ensure all actions, decisions, recommendations are documented, save records
Post - Emergency Phase Actions

Additional Considerations

DIRECT AND COORDINATE:

- Clean-up
- Waste
- Demobilization
- Radiological Data/Assessment
- Medical Follow up
- Media/public
Post - Emergency Phase Actions

Additional Considerations

- Documentation
- Importance
Post - Emergency Phase Actions

- Reconstruct the accident, evaluate response, develop lessons learned, update response plan, prepare final report
- Report Contents (minimum)
  - Summary
  - Description of the emergency
  - Response to the emergency
  - Human Consequences
  - Environmental Consequences
  - Dose Assessment
  - Conclusions and Recommendations
Summary

- This lecture provided
  - International requirements for establishing emergency management
  - Generic response organization
  - Initial response concepts
  - Emergency management functions
  - Responsibilities/tasks

- Remember: saving lives, treating injuries and fire fighting hazards are the priorities
Where to Get More Information

The role and tasks of the Emergency Manager are described in more details in the
INTERNATIONAL ATOMIC ENERGY AGENCY
Generic Procedures for Assessment and Response during a Radiological Emergency
IAEA-TECDOC-1162, Vienna (2000)