IAEA Post Graduate Educational Course in Radiation Protection and Safety of Radiation Sources

Intervention for Chronic and Emergency Exposure Situations

Basic Concepts of Emergency Preparedness



Concepts and Responsibilities

Lecture

Introduction

- Good planning in advance of an emergency can substantially improve the response
- Emergency planners should have a good understanding of the basic emergency preparedness principles
- Objectives of this lesson are to present and explain basic concepts of emergency preparedness

Content

- Objectives of emergency preparedness
- Planning areas and zones
- Planning levels and responsibilities
- Emergency classes and conditions
- Infrastructure elements
- Integrated planning concepts
- Summary

Background

- Many organisations may be involved in a response to radiation emergency
- In order to be effective, preplanning on the basis of established principles of radiation protection and safety is essential

The need for sound emergency preparedness is emphasized

Objectives of Emergency Preparedness

- To assure the capability to respond in a timely, effective, appropriate and coordinated manner to any nuclear or radiological emergency at all levels:
  - User or facility level
  - Local level
  - Regional level
  - National level
  - International level

Planning Areas

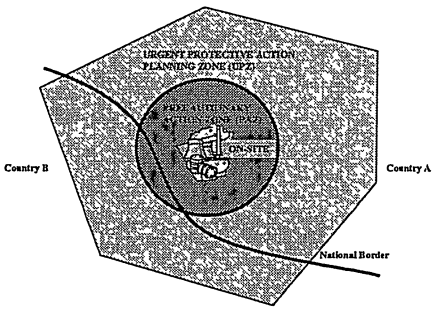
- On-site area – the area surrounding the facility within the security perimeter, fence or other property marker
- Off-site area – the area beyond that under control of the facility or user

Planning Zones

- Precautionary action zone – PAZ
- Urgent protective action zone – UPZ
- Food restrictions planning distance



Concept of Emergency Planning Zones



Precautionary Action Zone

- Threat category I 3 – 5 km
- Threat category II On-site
- Threat category III On-site

- Ranges are provided in recognition of the great uncertainty involved
- The size used should be scaled to the corresponding potential threat

Urgent Protective Action Planning Zone

- Threat category I 10 – 25 km
- Threat category II 0.5 – 2 km
- Threat category III Not required

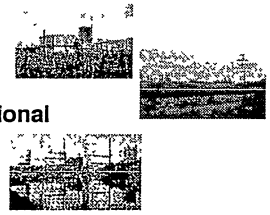
- In a particular emergency, protective actions might
  - be restricted to a small part of the planning zones, or
  - need to be taken beyond the planning zones (for the worst possible accidents)

Food Restriction Planning Distance

- Threat category I 500 – 1000 km
- Threat category II 10 – 50 km
- Threat category III Not required

Planning Levels and Responsibilities

- Effective emergency response requires mutually supportive and integrated emergency planning at three levels:
  - User
  - Off-site
  - International



Responsibilities – User Level

- To mitigate the emergency
- To protect people on-site
- To notify off-site officials and providing them with recommendations on protective actions and technical assistance
- To provide initial radiological monitoring

Responsibilities – Off-site Level

- Local officials: to provide immediate support to the user and prompt protection to the public in the vicinity
- National and regional officials: to plan and response on the national level
  - to plan longer term protective actions
  - to support local officials in the event their capabilities are exceeded

Responsibilities – International Level

- To implement Notification and Assistance Convention
  - IAEA, countries
- To provide technical, humanitarian or medical assistance
  - UNDHA, WHO, others

Emergency Classes and Conditions

- Response to an emergency requires rapid and coordinated response
- This can be accomplished by using internationally agreed classification system:
  - General emergency
  - Site area emergency
  - Facility emergency
  - Alert
  - Uncontrolled source emergency

General Emergency

Threat Category I and II

- Should be declared when an actual or substantial risk of a release of radioactive material or irradiation warranting immediate implementation of urgent protective actions off-site exists
- Actions should be promptly taken to:
  - mitigate the event
  - protect people on-site
  - protect people within PAZ and UPZ (as appropriate)

Site Area Emergency

Threat Category I and II

- Should be declared when a major decrease in the level of protection for those on-site and near the facility occurs
- Actions should be promptly taken to:
  - mitigate the event
  - protect people on-site
  - make preparations to implement protective actions off-site (if necessary)

Facility Emergency

Threat Category I, II and III

- Should be declared when a major decrease in the level of protection for workers on-site occurs
- Actions should be promptly taken to:
  - mitigate the event
  - protect people on-site
- Note: this class does not represent an off-site threat

Alert

Threat Category I, II and III

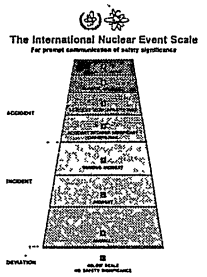
- Should be declared when an uncertain or significant decrease in the level of protection for the on-site personnel or the public occurs
- Actions should be promptly taken to:
  - Assess and mitigate the event
  - Increase the readiness of the on- and off-site response organisations (as appropriate)

Uncontrolled Source Emergency

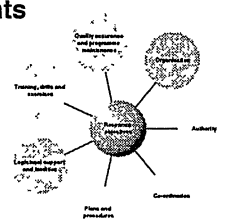
- Occurs in case of lost, stolen or loss of control of a threat category IV dangerous sources
- First responders should take appropriate actions to minimise the consequences of emergency

International Nuclear Event Scale – INES

- The emergency classification should not be confused with the International Nuclear Event Scale – INES
- INES is designed to indicate how serious an event was after it is understood and is NOT the basis for the response



Infrastructure Elements

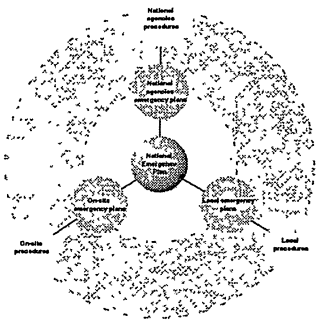


- Authority
- Organisation
- Coordination
- Plans and procedures
- Logistical support and facilities
- Quality assurance and programme maintenance

Integrated Planning Concepts

- Capabilities, plans and procedures should be structured into a coherent and interlocking system
- Response plans should be highly coordinated and consolidated
- Assignments of responsibilities should be done jointly with all interested parties represented
- Existing governmental body must be identified to act as a national coordinating authority

Integrated Planning Concept



Summary

- Two planning areas
- Two planning zones
- Three planning levels
- System for classifying radiation emergencies
- Preparedness elements
- Integrated planning approach to preparedness

Where to Get More Information

- Other lessons in this module
- References on cover page

Preparedness and Response for a Nuclear or Radiological Emergency
IAEA, Safety Standard Series No. GS-R-2