

Arrangements for the Termination of a Nuclear or Radiological Emergency

Management Organization and Infrastructure for the Transition Phase

Lecture 04

Introduction.

Para. 3.1, GSR Part 7

*“The goal of emergency preparedness is to ensure that an adequate capability is in place... for an **effective response** in a nuclear or radiological emergency ...”*



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Preparedness and Response for a Nuclear or Radiological Emergency

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General Safety Requirements No. GSR Part 7



Introduction.

Section 3, GSG-11



*“Before the termination of the emergency, **any change or transfer of authority and responsibilities from the emergency response organization to organizations responsible for the long term recovery operations** has been completed.”*

*“The **sharing of any information and data** that were gathered during the emergency exposure situation and that are relevant for long term planning has been organized among the relevant organizations and authorities.”*

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General Safety Guide

No. GSG-11



Which goals are mainly applicable to either the Emergency Response Phase or the Transition Phase?



- Regain control of the situation and mitigate the consequences;
- Save lives;
- Avoid or minimize severe deterministic effects;
- Render first aid, provide critical medical treatment and manage the treatment of radiation injuries;
- Reduce the risk of stochastic effects;
- Keep the public informed and maintain public trust;
- Mitigate, to the extent practicable, non-radiological consequences;
- Protect, to the extent practicable, property and the environment;
- Prepare, to the extent practicable, for the resumption of normal social and economic activity.



Purpose



- Consider the use of the results of the hazard assessment in preparing arrangements for the transition phase;
- Provide guidance on the arrangements for the administration and management of organizations during the transition phase;
- Identify the elements of infrastructure necessary for the transition phase.

Learning Objectives

- Recognize the governing framework, coordination and management aspects of the response during the transition phase;
- Consider the requirements for human, technical and financial resources, and the mobilization and coordination mechanisms among different organizations necessary in the transition phase;
- Recognize the importance of integrated planning (all-hazards approach) for planning for the transition phase;
- Consider the need for transboundary coordination of preparedness and response.

Contents



- Introduction to:
 - Use of the hazard assessment for developing adequate preparations
 - Types of organizations and modes of operation in the emergency response phase and the transition phase
- Arrangements for the transition phase:
 - Authorities, responsibilities, management
 - Information transfer
 - Ensuring continuity
- Infrastructure elements:
 - Plans and procedures
 - Training, drills and exercises
 - Logistical support and facilities
 - Quality management programme
- Compensation of victims for damage

Adequate preparations

- What constitutes adequate preparations for response to a nuclear or radiological emergency depends on the applicable postulated emergency scenarios and their associated consequences.
- Hazard assessment for EPR should be used to identify the arrangements required for all phases of the emergency.



Hazard assessment in preparedness

- GSR Part 7 requires that a **hazard assessment** is performed to:
 - Identify facilities/activities/sources that may lead to an emergency **warranting protective or other response actions** and areas/locations where such actions may be needed;
 - Provide the basis for a graded approach in EPR.
- Use the results of a hazard assessment to:
 - Anticipate **what the transition phase might encompass**;
 - Identify **actions that may be warranted to enable the termination of an emergency**;
 - Identify **options and limitations** of specific emergency arrangements to be made for the transition phase;
 - Assess the **time frames anticipated** in which different emergencies are expected to be terminated.

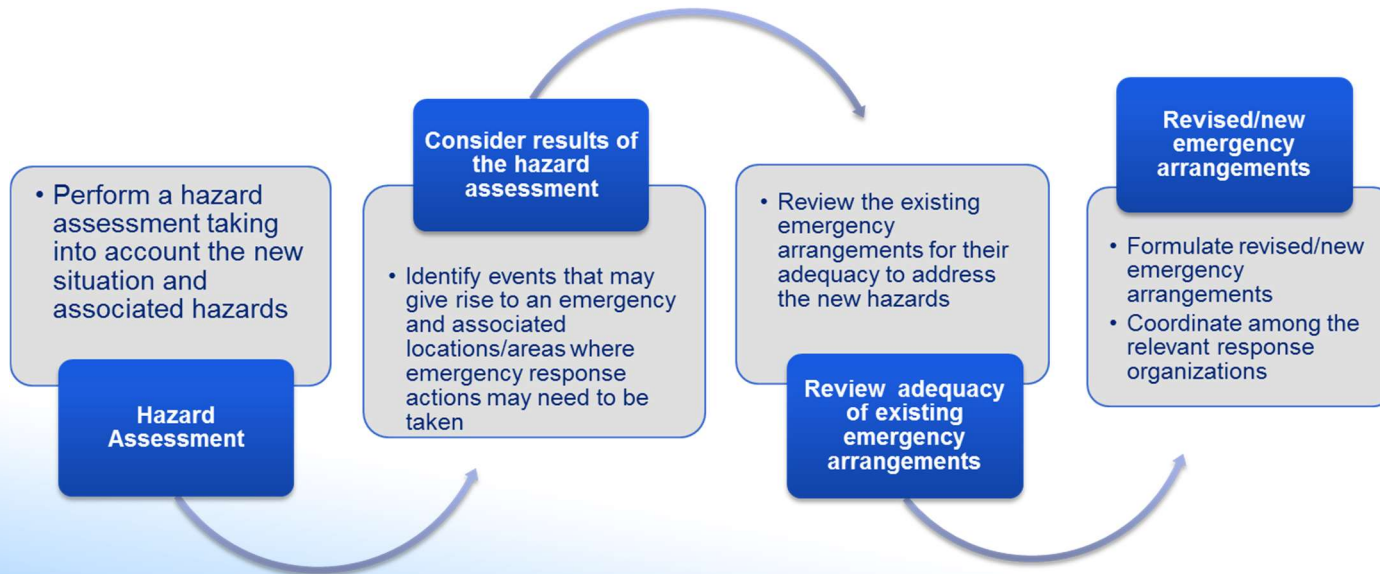
Expected exposure situation that is likely to apply following termination



Emergency class	Expected exposure situation following termination
General emergency at emergency preparedness (EP) Category I or II facility (with significant release) (Example: Fukushima Daiichi accident 2011)	Existing exposure situation
Site area emergency (Category I or II) or facility emergency (Category I, II or III) (Example: Paks fuel damage incident 2003)	Planned exposure situation
Alert at Category I, II or III facility (Example: Fire or explosion potentially affecting areas containing safety systems)	Planned exposure situation
Other nuclear or radiological emergency (Category IV) (Examples: Hueypoxtle radiological incident 2013 and Goiânia accident 1987)	Planned exposure situation or Existing exposure situation

Hazard assessment in transition phase

- As the potential hazards may have been changed due to the emergency, one of the prerequisites for termination is to perform a hazard assessment taking into account the new situation and associated hazards.



Example

- Prior to the emergency, a nuclear power plant had a set of emergency arrangements based on the hazard assessment.



Image reproduced from 'The Fukushima Daiichi Accident', IAEA, Vienna (2015)

Following the emergency, the hazards associated with the plant changed, including, for example:

- Damaged buildings;
- Evacuation of previous precautionary action zone (PAZ) and urgent protective action planning zone (UPZ);
- Access to the plant more limited due to road damage.

Interim response capability

- New hazard assessment might highlight the need for revised emergency arrangements.
- Formal establishment of such revised arrangements may be a lengthy process:
 - Want to prevent unnecessary delay in the termination of the emergency.
- Establishment of an interim response capability should be considered (e.g. few revised procedures and training on new hazards).

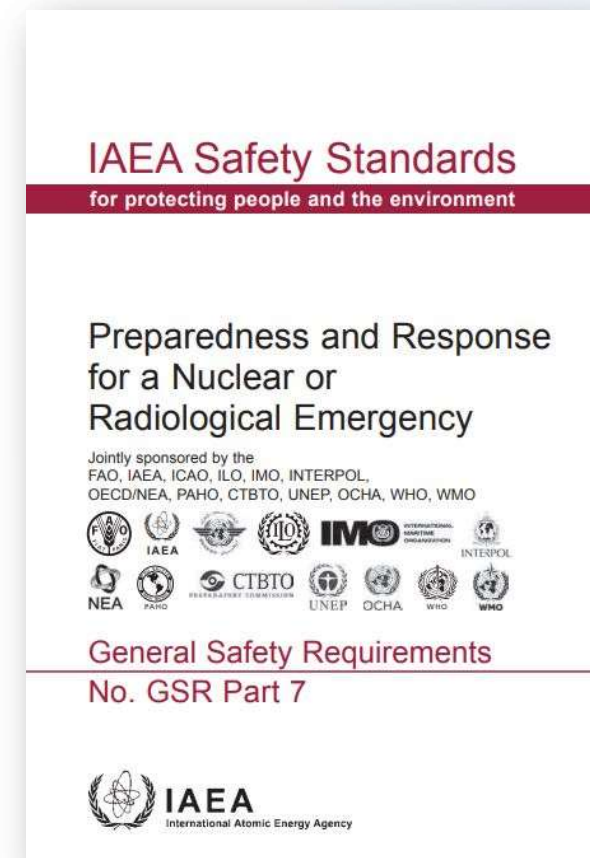
IAEA Safety Standards Series No. GSR Part 7

Requirement 20

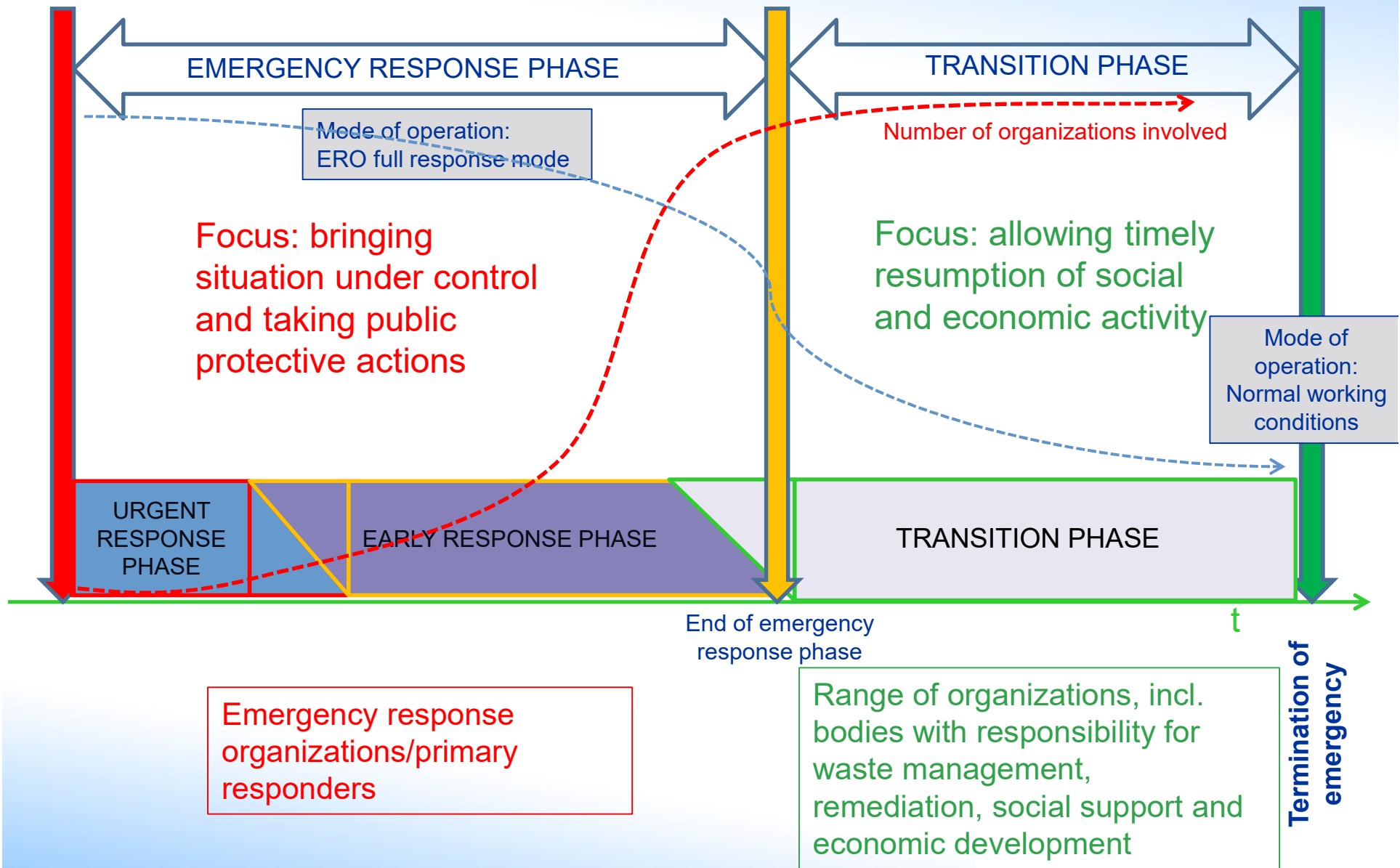


*“The government shall ensure that **authorities for preparedness and response** for a nuclear or radiological emergency are **clearly established**.”*

*“Arrangements for delegation and/or transfer of authority specified in emergency plans, and for coordination and communication in **all phases** of the response.”*



Organizations involved and modes of operation



Discussion



As the emergency moves from the urgent response phase to the early response and then the transition phase, additional organizations will become involved in the response:

- What type of arrangements need to be made at the preparedness stage to allow for their effective integration during the transition phase?

Arrangements for the transition phase to be made at the preparedness stage



- Identification of authority, roles and responsibilities of all organizations for the transition phase:
 - Based on expected activities to fulfil prerequisites for termination;
 - Examples of additional organizations for the transition phase: waste management operators, psychological support services, compensation scheme administration, agricultural advisors.

Arrangements for the transition phase to be made at the preparedness stage (cont'd)



- Some prerequisites to be fulfilled by the **operating organization** in addition to responsible **off-site response organizations**:
 - Termination in areas off the site will be subject to confirmation by the operating organization that respective prerequisites have been fulfilled on the site:
 - This needs to be clearly understood and well coordinated.
 - Off-site organizations may include foreign organizations in the case of transboundary releases:
 - Appropriate support and coordination need to be ensured at the preparedness stage.

Arrangements for the transition phase to be made at the preparedness stage (cont'd)



- Allocation of authority and responsibility for making the decision on termination:
 - Recognizing that the authority and responsibility may be different for on-site areas and off-site areas;
 - Coordination needs.
- Implementation of provisions in legal and regulatory framework to allow for effective decision making and coordination:
 - To be identified and made at preparedness stage.

Arrangements for the transition phase to be made at the preparedness stage (cont'd)



- Ensuring availability of necessary staffing and resources.
- Establishment of a mechanism for mobilizing resources and coordinating different organizations at different levels.
- Information sharing and cooperation arrangements with neighbouring countries.

Arrangements for the transition phase to be made at the preparedness stage (cont'd)



- Establishment of provisions for a **change in authority and responsibility during the transition phase**, including:
 - Coherent and clear process for the transfer of authorities and responsibilities;
 - Prompt resolution of conflicting responsibilities or gaps;
 - Effective channelling of multi-disciplinary contributions.

Arrangements for the transition phase to be made at the preparedness stage (cont'd)



- Transfer of authorities and responsibilities to be process that is:
 - Formal;
 - Coordinated;
 - Transparent (to other organizations and to all interested parties).
- With the formal termination, **ERO deactivated**:
 - Certain responsibilities may need to be additionally assigned to other organizations.

Challenges in management during the transition phase



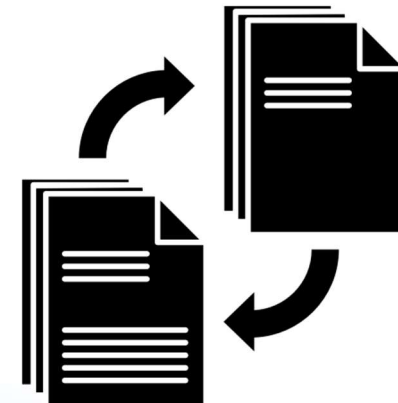
- Different management structures may exist simultaneously in different geographical areas (including across national borders);
- New organizations need to quickly develop a good understanding of the situation:
 - Particularly among organizations assuming responsibilities during the transition phase and in the longer term.



Arrangements for relevant information/data sharing

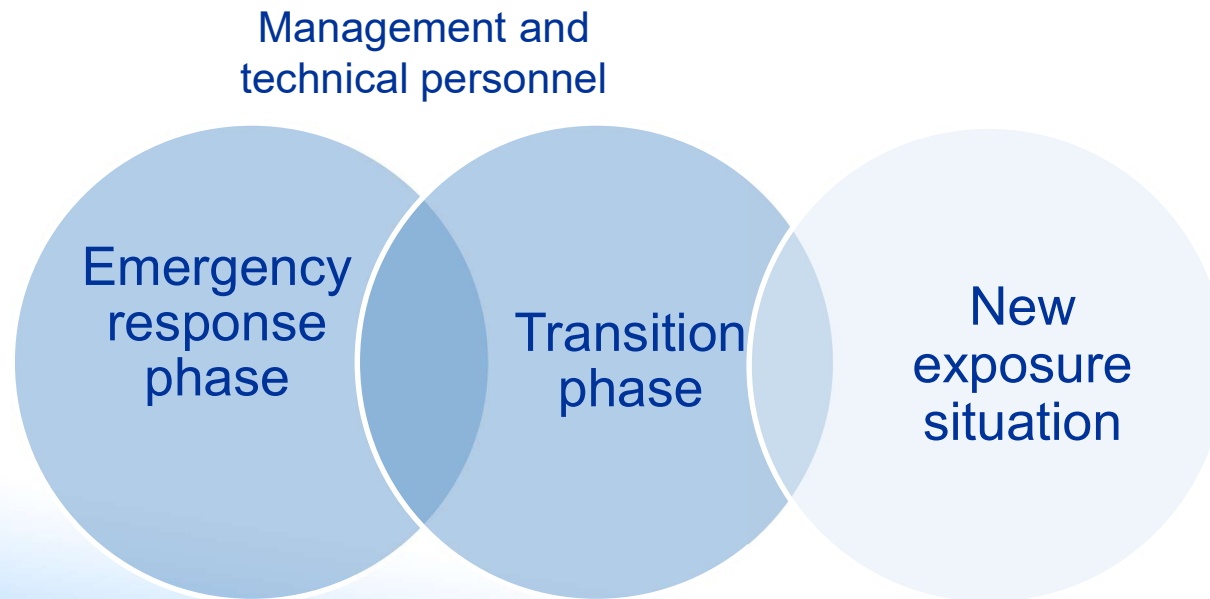
Information transfer considerations

- Sharing of relevant information and data requires arrangements for:
 - Identifying the type of information and data of relevance for the transition phase and the longer-term
 - Identifying relevant organizations that have to have access to this information and data
 - Mechanisms for recording and exchanging information and data among relevant organizations and the need for continued data collection

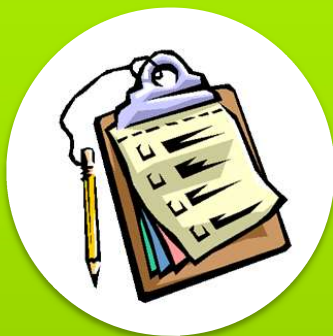


Ensuring continuity

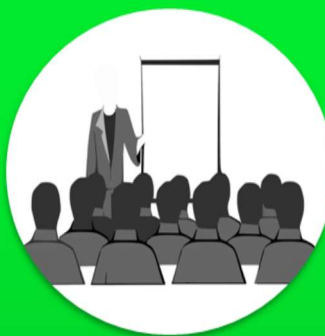
- Consider an overlap of management and technical personnel involved in the emergency response phase and in the transition phase to ensure continuity



Other infrastructure elements



Plans and
procedures



Training,
drills and
exercises



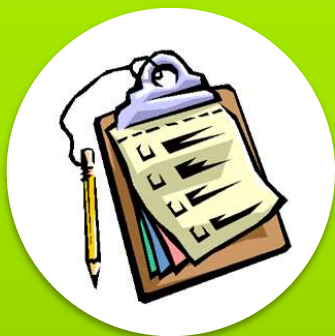
Logistical
support and
facilities



Quality
management
system

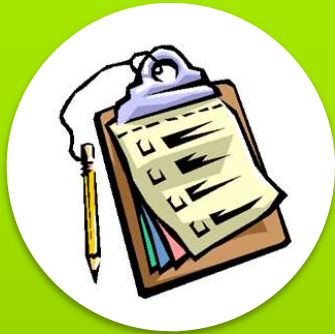


Plans and procedures



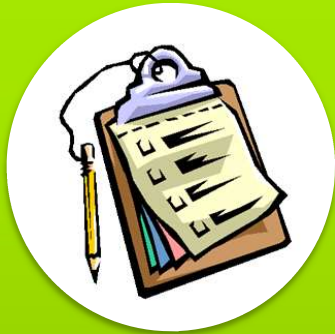
- GSR Part 7 requires that plans and procedures cover the entire period from the **onset of the emergency until its termination**.
- Developed by all relevant organizations to allow effective implementation of the protection strategy:
 - Taking account of the hazard assessment;
 - Considering the prerequisites for the termination of the emergency.
- Take account of the fact that more organizations will be involved in response in the transition phase.

Plans and procedures (cont'd)



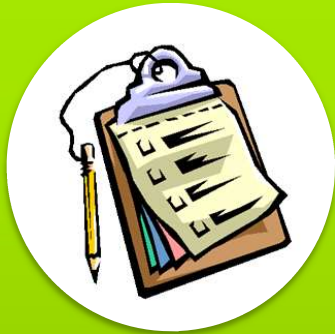
- States usually have arrangements for returning to normal social and economic activity after any type of emergency (e.g., flooding, earthquakes, chemical spills);
- May include arrangements for relocation of population, psychological support, compensation, clean-up, etc.

Plans and procedures (cont'd)



- Such arrangements can support preparations for the transition phase after a nuclear or radiological emergency.
- The arrangements necessary for nuclear/radiological emergencies need to be **integrated** with those for other emergencies:
 - **All-Hazards Approach.**

Plans and procedures (cont'd)



- An all-hazards approach:
 - Optimized resource use;
 - Capacity to deal with multiple hazards through functional planning;
 - Flexible, integrated arrangements.

Discussion



- What needs to be included in the national emergency plan for the transition phase?

Emergency plan

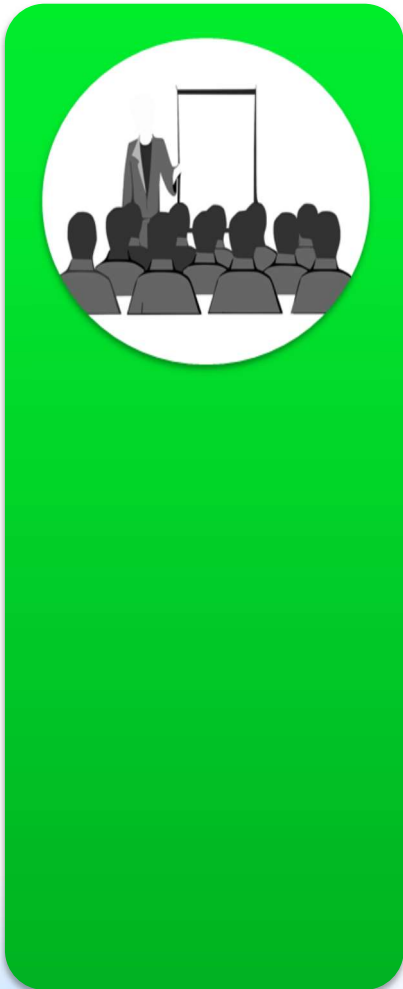


- Clearly describes **roles and responsibilities** during the transition phase and beyond, as appropriate.
- Takes account of **changes in authority** and responsibilities between different phases, including:
 - Triggering mechanisms;
 - Coordination arrangements;
 - Decision making processes and criteria (in line with the protection strategy);
 - Human, technical and other resources;
 - Types of information and data that need to be transferred and the necessary supporting arrangements.

Emergency plan (cont'd)

- Elaborates **arrangements** for:
 - Taking various actions during the transition phase in light of the relevant prerequisites;
 - Adjusting the protection strategy to meet the actual circumstances;
 - Decision making on termination.
- Elaborates **preparedness aspects** that ensure effective emergency response during the transition phase;
- Is developed in a coordinated and consistent manner at different levels:
 - National, regional, local;
 - Organizational;
 - Facility;
 - International (where relevant).

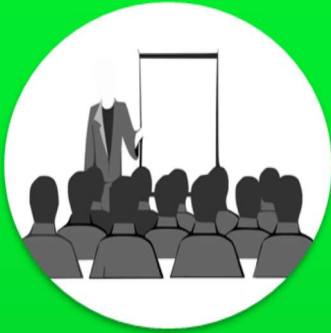
Training, drills and exercises



- Arrangements for selection of personnel and for training to ensure personnel selected have the requisite knowledge, skills and abilities to perform assigned response functions.
- Relevant personnel to take part in **regular training, drills and exercises**.
- All specified response functions and organizational interfaces **tested at suitable intervals**.

Applies for all phases

Training



- Knowledge, skills and abilities different from those necessary for the emergency response phase may apply.
- In establishing the training needs for the transition phase consider:
 - Change of focus from public protection to resumption of social and economic activity and providing for people's well-being;
 - Need to address different activities that will apply during the transition phase;
 - Additional organizations and people to be involved.

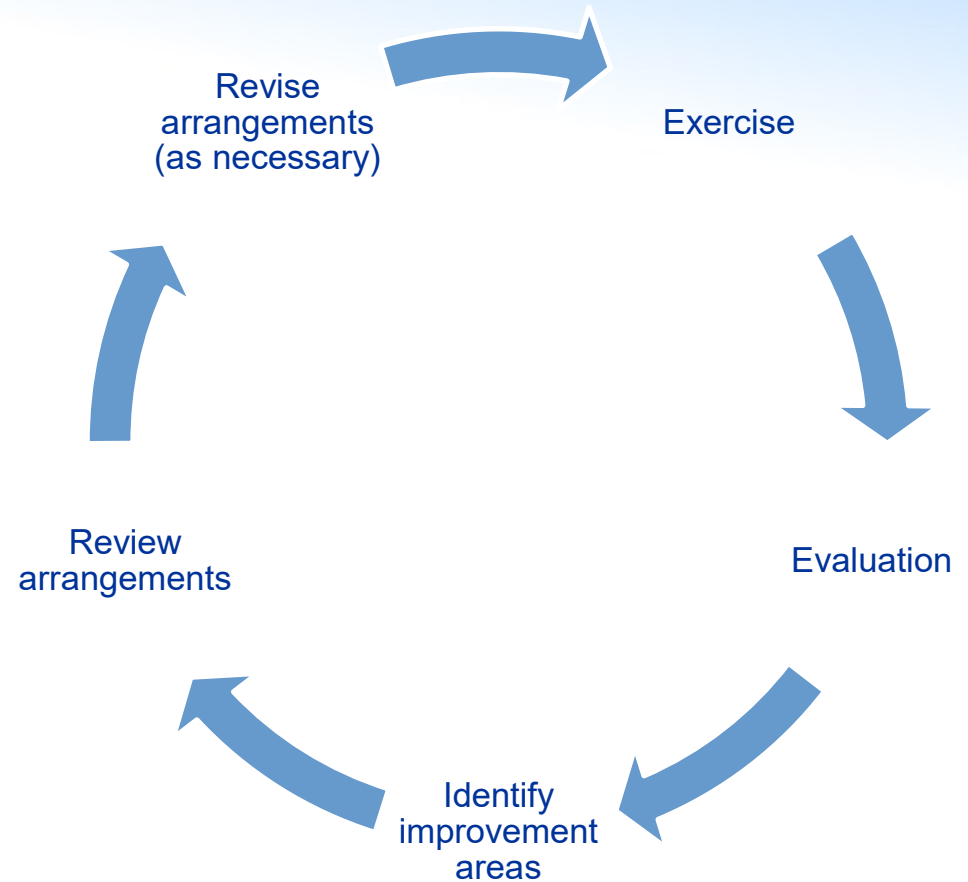
Drills and Exercises

- Overall exercise programme should cover transition phase activities and personnel:
 - More frequent small-scale exercises on specific aspects of transition phase are feasible:
 - At facility, local, regional and national levels.
 - Participation of relevant organizations (including those not involved in the urgent response phase);
 - Test arrangements to facilitate resumption of normal social/economic activity every 3-5 years.



Review

- Evaluation of training, drills and exercise programmes as part of the management system:
 - Areas for improvement provide the basis for review and revision of transition phase arrangements, where necessary.



Logistical support and facilities



Preparedness:

- Identification and selection of logistical support and facilities considering the prerequisites for termination of the emergency;
- Establishment of arrangements for the acquisition, deployment and mobilization of logistical support and communication to the relevant parties.

Example

- In response to the Goiânia accident, the necessary resources for clean-up were deployed from a distance of around 1300 km from the site:
 - At the peak, over seven hundred staff were deployed for decontamination activities.



Image reproduced from 'The Radiological Accident in Goiânia', IAEA, Vienna (1988)

Discussion



- Can you give some examples of logistical support and facilities that may be needed during the transition phase?

Logistical support and facilities

Examples of emergency response facilities in the transition phase:

- Public support centres;
- Reception centres;
- Laboratories for sample analysis;
- Medical support facilities;
- Radioactive waste collection points;
- Storage facilities.



Quality management system



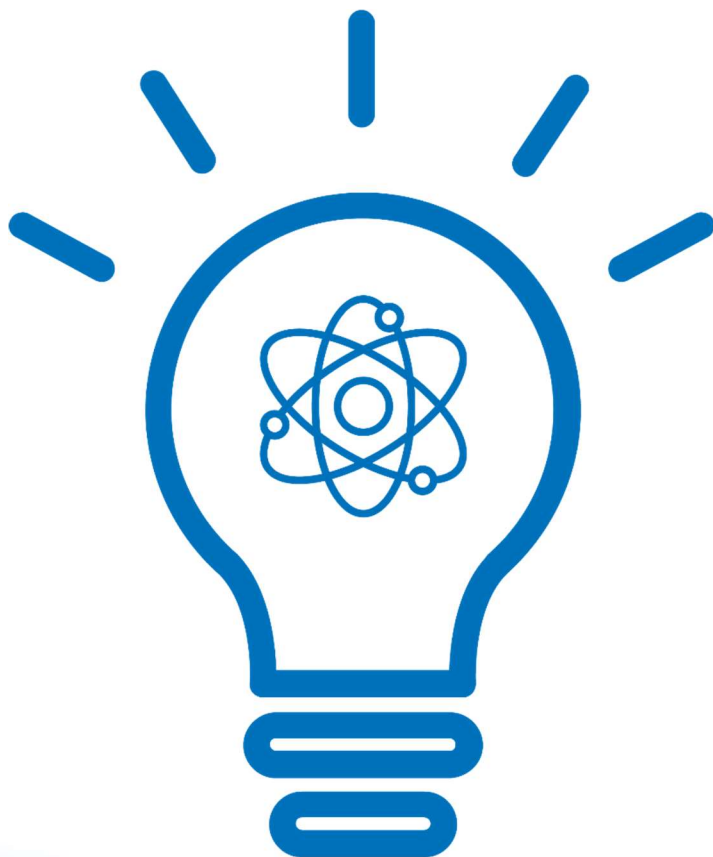
- Establish a programme within an **integrated management system** to ensure availability and reliability of all arrangements when needed, including:
 - Periodic and independent appraisals;
 - Arrangements for incorporating lessons from research, operating experience and emergency exercises;
 - Record keeping.
- Cover all the arrangements from the emergency onset by the time the emergency is terminated.

Compensation of victims for damage

- Ensuring efficient return to normal social and economic activity likely requires the compensation of victims for damage caused by emergency or response actions;
- Provision of such a public reassurance is an important aspect for later phase of an emergency.

Emergency type	Compensation governed by
Radiological emergencies	<ul style="list-style-type: none">• Exclusively by national laws (e.g., civil third party liability)
Nuclear emergencies	<ul style="list-style-type: none">• Number of liability treaties that exist at international level.• National rules may also apply

Summary



- Allocating authority, assigning responsibilities and making other preparedness arrangements is essential for providing capability for effective response during the transition phase.
- Consider how the authority and roles may need to change through various phases of the emergency response.
- Establishing effective information data flow and coordination mechanisms is essential to guide informed decision-making on activities to be carried out during the transition phase.



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