

# Strategic aspects of nuclear and radiological emergency management

by B. Ahier\*

Emergency situations demand that actions be taken by responsible organisations in a timely and effective manner to mitigate consequences for the population, infrastructure and the environment, and to support the return of affected areas to normal social and economic activity to the extent possible. To deliver an effective response over the emergency management timeline (see Figure 1), it is necessary to make, maintain and exercise adequate plans and arrangements in advance of an emergency situation. These must contain appropriate elements and resources for preparedness, response and assistance to identified threats, recognise and include all implicated partners, and take account of international interfaces. Effective management of complex emergency situations that can lead to a wide range of consequences and involve multiple organisations at the local, national and international levels also requires anticipation of the range of decision-making needs, an understanding of the interactions between response organisations and a model for their co-ordination.

Experience from managing emergency situations has shown that the integration of these factors into emergency preparedness and response arrangements should be based on a guiding strategic vision. Emergency response is a dynamic process that develops in time from a situation of little information to one of potentially overwhelming information. Within this context, emergency response organisations must be able to respond in an appropriate and timely manner at any point along the emergency management timeline. This will be facilitated by an overarching framework to guide the decision-making process.

To contribute to work in this area, the NEA Committee on Radiation Protection and Public Health (CRPPH) Working Party on Nuclear Emergency

Matters (WPNEM) reviewed its collective experience to extract key themes that could form a strategy for improving decision-making in emergency management. This focused on the NEA International Nuclear Emergency Exercise (INEX) series, as well as experience from national emergency management programmes. Additionally, experience from the INEX-3 exercise (2005-2006) has shown that longer-term consequence management and the transition to recovery remain particularly challenging. As such, the WPNEM also focused on the development of strategies for countermeasures for managing the longer-term consequences of an emergency.

As decision-making is at the core of emergency management, the WPNEM developed a strategic framework to be considered by national emergency management authorities when establishing or enhancing processes for decision-making, and when developing or implementing protection strategies. The outcomes are presented in the report *Strategic Aspects of Nuclear and Radiological Emergency Management*.<sup>1</sup> The report provides insights into and a strategic basis for decision-making as an integral part of emergency management. Such a guiding strategic view, applied during preparedness, will enhance the management of complex emergency situations involving many organisations and stakeholders at the local, national and international levels.

## Planning for effective decision-making

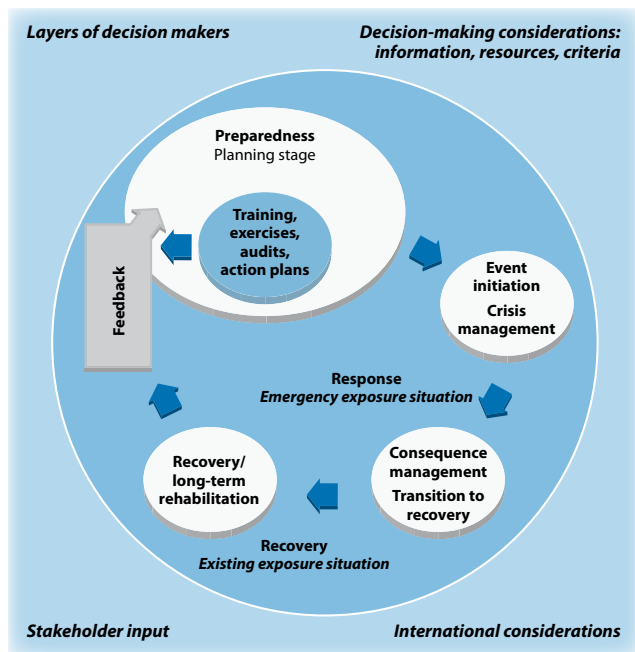
A strategic approach to decision-making can facilitate timely, effective and compatible decision-making by response organisations at every level within the emergency management structure and between countries, helping to ensure optimal protection of health, the environment and society during

Figure 1: Emergency management timeline and emergency phases

Preparedness	Response				Recovery
	Early		Intermediate		Late
Planning stage	Event/ response initiation	Crisis management	Consequence management	Transition to recovery (including recovery planning)	Recovery/long-term rehabilitation
	Emergency exposure situation				Existing exposure situation

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**Figure 2:**  
**Overview of the emergency management cycle**



an emergency situation. Within this context, the first part of the report provides a framework of seven key elements for decision-making, briefly described below, which cover the emergency management timeline and help to identify and frame the relevant aspects that should be considered in formulating a decision.

### *Planning for decision-making within the emergency management cycle*

Decision-making lies at the core of emergency management. Any strategy for decision-making needs to be placed coherently within the overall emergency management cycle: preparedness through response, recovery and post-event feedback (see Figure 2).

#### *Depth of preparedness*

The credible scenarios for which detailed planning should be undertaken are derived from a comprehensive threat and risk assessment that looks at all possible nuclear and radiological emergencies in terms of their origin, likelihood and magnitude of impacts. The outcomes of these assessments will provide an indication to emergency planners of the level of detail to which each scenario should be planned, either in whole or at different points in the timeline.

### *The emergency management structure and co-ordination of decision-making*

Different organisations in different jurisdictions will have a role in the emergency management cycle. A key aspect of decision-making is therefore co-ordination of the various decision-making processes

among all the organisations involved at the local, national and international levels. Co-ordination of arrangements and responsibilities for decision-making across jurisdictions for different scenarios is therefore important. The goal is to have the approaches to decision-making, and the resulting decisions, as compatible as practical across the spectrum of the response to ensure optimal protection of health, the environment and society.

### *Identifying and characterising key decision-making points*

Anticipating, identifying and characterising the key decision-making points along the emergency timeline is critical to successful planning for emergency situations. These include the types and timelines of likely decisions, and their characteristics such as the inputs necessary for establishing an initial technical basis for recommendations, the outputs and the linkages to other response partners and stakeholders.

### *Co-ordinated communications*

The co-ordination of decision-making both nationally and internationally, amongst all parties implicated in the response, is critical. Effective communications and co-ordination will facilitate compatible decision-making.

### *Appropriate and timely decision-making*

While the threat and risk assessment will identify the types of scenarios for which detailed plans should be elaborated, each emergency will have its own characteristics. Decisions must match the characteristics of the particular emergency. Processes that facilitate the development of situation-specific recommendations are critical, because an appropriate decision for one emergency may be different in another situation.

### *Stakeholder involvement*

Complex emergency situations require the involvement of a broad range of stakeholders to facilitate their effective management. Emergency planners and decision-makers should identify the range of relevant stakeholders and how their involvement may impact the effectiveness of decisions and the implementation of protection strategies. Relevant stakeholders, either directly or through their representatives, should be included in the emergency planning arrangements.

### *Consequence management and transition to recovery*

In addition to mitigating the impacts on the population, infrastructure and the environment, planning for the emergency response includes the

ultimate goal of returning affected areas to normal social and economic activity to the extent possible. This goal will present significant challenges not only to affected populations, but also to the organisations responsible for the emergency management and recovery activities in countries directly or indirectly affected by the event. Meeting this goal will be facilitated by effective and co-ordinated management of the consequences and the transition to recovery, which will set the context (including socio-economic aspects) for the long-term recovery. Management strategies that are developed and implemented as part of emergency preparedness will improve decision-making throughout the emergency response.

In this context, the second part of the report on strategic aspects of emergency management provides a framework for planning and implementing protection strategies as part of consequence management and the transition to recovery, focusing on those areas of interest identified in the INEX-3 exercise. A key aspect of these later phases of the emergency timeline is that the actual situation may be quite difficult to predict in detail in advance. As such, while protection strategies for the early phase of an emergency situation may be relatively straightforward to characterise and to prepare for an identified scenario, protection strategies for later periods following the emergency's onset become increasingly difficult to plan in detail during the preparedness phase.

For this reason, it is important to plan structures and strategies for later-phase consequence and recovery management rather than specific actions. This does not mean that detailed pre-planning is unnecessary, but rather that preparedness should focus on identifying the types of response areas and needed actions rather than their specific details.

Building on the previously described framework for decision-making, the framework described below addresses those aspects of consequence management and the transition to recovery that can most effectively be planned in advance. It is hoped that they will find applicability amongst national emergency management authorities and international organisations by providing insights into key considerations for planning and implementing protection strategies, specifically in the development of necessary plans, procedures and arrangements.

### *Building the emergency management structure for consequence management and recovery*

During the preparedness phase, it is important to identify, co-ordinate and define the roles and responsibilities of the emergency management structure for consequence management and for recovery. This includes building partnerships with identified organisations and jurisdictions for planning and implementing a co-ordinated response, developing and implementing protection strategies, coordinating recovery objectives and strategies,

and implementing strategies for co-ordinated international communication facilitating compatible decision-making.

### *Dealing with the consequence management phase*

As part of preparedness, responsible organisations should use the threat and risk assessment to identify potential impacts and possible countermeasures for each credible scenario. Optimised protection strategies for consequence management and the transition to recovery should be developed prior to an emergency in co-ordination with all relevant parties. During an emergency, decision-makers should be advised on appropriate courses of actions throughout the consequence management and transition to recovery phases. Countermeasures should be terminated when successfully implemented, no longer applicable, or when event changes indicate the need for different approaches or countermeasures.

### *Managing the transition to recovery*

It is important to identify potential issues that will need to be addressed during the long-term recovery after an emergency. To support this, a basic framework recovery plan should be developed as part of preparedness, with common issues to facilitate the recovery operations, for detailed elaboration in response to a specific emergency. This will include a description of roles, responsibilities, priorities, timelines and financial implications.

### *Developing and maintaining processes for stakeholder involvement*

Planners should identify and involve all relevant stakeholders in emergency preparedness in order to improve the development and implementation of appropriate protection strategies and the transition to recovery.

## **Conclusion**

It is hoped that consideration by emergency planners and decision-makers of the frameworks presented in the report will facilitate compatible and/or consistent approaches to consequence management and recovery amongst the multiple layers of organisations and entities, nationally and internationally, involved in responding to emergency situations. *Strategic Aspects of Nuclear and Radiological Emergency Management* may be downloaded free of charge on the NEA website at [www.nea.fr](http://www.nea.fr).

## **Note**

1. The WPNEM gratefully acknowledges the work of its three expert groups that developed different aspects of this report, and thanks the group chairs – Mr. B. Powell (United Kingdom), Ms. C. McMahon (Ireland), Mr. F. Ugletveit (Norway) – and the expert groups members for their contributions.