

# Nuclear emergency management: what's new?

Activities in the area of nuclear emergency management have flourished over the past several years. Through the use of internationally organised, multinational drills, a wealth of experience and knowledge have been gained at both the national and international levels. The lessons learnt primarily concerned the early, urgent-communication phases of nuclear emergencies, and are currently in the process of being consolidated and incorporated into national structures and approaches. While communication and data management technologies continue to advance, multinational exercises are becoming more routine and tutorial. The focus of current work is thus shifting towards later accident phases, particularly to the mid-term phase, when control has been regained of the emergency situation but the accident's consequences have yet to be addressed.

In addition to these "classic" nuclear emergency response interests, since the 11<sup>th</sup> of September 2001 national authorities have been concerned with accident response capabilities in case of terrorist acts that might involve radiation. They have notably sought to verify that existing emergency response structures, plans and capabilities are adequately flexible to address the results of

terrorist activities. This, in turn, has drawn attention to the physical security of large radiation sources and of nuclear installations.

## Emergency exercises and lessons learnt

From the modest national and international nuclear emergency response structures and capabilities of the pre-Chernobyl era, significant and sustainable improvements have been achieved. This has not been, however, without significant efforts. Recognising the need to improve international communication and co-ordination following the Chernobyl accident, the Conventions on Early Notification and on Assistance were developed through the International Atomic Energy Agency (IAEA) and quickly ratified by a majority of countries. The European Commission also issued a Directive to its Member States requiring accident notification and public communications. However, to assist countries in improving their international capabilities, the NEA held the first International Nuclear Emergency Exercise (INEX 1) in 1993. This table-top exercise brought together national nuclear emergency response organisations to address a simulated accident at a fictitious reactor near the border of two fictitious countries. The results of this exercise highlighted the need for more detailed study of international issues, and led the NEA to develop INEX 2. This more ambitious drill used real national and international emergency response centres, their hardware, their procedures and their personnel to address, in real-time, a simulated accident at a real reactor. Four

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such exercises were performed in the INEX 2 series between 1996 and 1999, with the active participation of the IAEA and the EC. Finally, the INEX 2000 exercise was carried out in 2001, similarly to the INEX 2 exercises, but with the principal objective of testing the implementation of lessons learnt from INEX 2.

The experience from these exercises can be broadly divided into the areas of communications and emergency response structural improvements. At the national level, it was recognised that the communication of accident-related information to other countries was of strategic importance. This came from the realisation that, even for accidents with effects only within one country's national borders, other countries would be very interested in the health and safety of their citizens in the affected country, in the transport of goods from the affected country, in the movement of people (by train, plane or car) into and out of the affected country, and numerous other health and safety issues related to the general "interconnectedness" of the modern world and its infrastructures. In addition, in an age of global news communication, it was concluded that without accurate, verified information, governments and their structures could be seen as "out of touch", thus eroding social confidence in a government's ability to appropriately protect its citizens. For these strategic reasons, national governments made international agreements (the conventions and directives mentioned above) to formalise the requirement to communicate. To implement this, and based on the experience from exercises, the emergency management community focused on more appropriately addressing the information needs of decision makers. This involved clearly identifying the types and formats of information that should be supplied at the various stages of an accident to facilitate decision making by government officials. Further, the technological mechanisms for collecting, transmitting and formatting accident-related information were improved, moving from telex and fax communications to increasing use of the worldwide web and electronic mail.

In parallel to the need for better and more tailored communication and information, the co-ordination of actions was identified as a policy objective. In border regions, the co-ordination of urgent countermeasures for population protection was seen as needed to prevent affected populations from negatively perceiving "different levels of protection" in adjoining areas separated by a simple national border (two sides of a river for

The INEX Series	
1993:	INEX 1
1996-1999:	INEX 2
2001:	INEX 2000
2004+:	INEX 3

example) when such differences have been established for valid reasons. Local cross-border ties were reinforced as a result of this experience, and joint, local exercises are increasingly common. On a more international scale, some level of co-ordination of such things as travel and trade restrictions or alerts was seen as being in the interest of all affected and non-affected countries. Networks of national and international response organisations, connected through modern electronic means, have been improved to facilitate such co-ordination.

At the national level, these lessons have incited many governments to improve and streamline their national decision-making processes and structures in order to appropriately collect and diffuse all needed information. This recognition of the strategic importance of such nuclear emergency management structures, with the concomitant implications for resources, has led to changes and improvements at the national and international levels.

### A shift in focus

While the experience and lessons from large-scale nuclear emergency exercises continues to be internalised, national and international strategic focus is shifting to other areas. Notably, since the terrorist attacks on the 11<sup>th</sup> of September, significant efforts have been made to analyse potential radiological threats, and to assure that existing nuclear emergency response structures and processes are sufficiently flexible to appropriately address these threats. Specific training and procedures have been developed nationally, as needed. Even before the terrorist attacks, however, the radiological protection community was increasingly focusing its attention on accidents with large radiation sources, such as those used in industrial

radiography, medical cancer therapy machines or research institutes.

Apart from the Chernobyl accident, where 31 fire fighters died of radiation poisoning, no nuclear workers or members of the public have ever died as a result of overexposure to radiation due to a commercial nuclear reactor accident. On the contrary, most of the serious radiological injuries and deaths that occur each year (two to four deaths annually and many more exposures above regulatory limits) are the result of exposures to large, uncontrolled radiation sources. These sources often come from abandoned medical clinic or industrial radiography equipment, and are often found by unsuspecting individuals who would like to sell them as valuable scrap metal. Better control of large sources and a more efficient network for the exchange of information regarding lost sources has been developed through the IAEA, and several major international conferences have been devoted to these issues. The new threat of terrorist attacks only heightens the need for great vigilance in the protection and control of such large and potentially dangerous sources of radiological hazard. It also bears noting that, in conjunction with concern over terrorist threats, much national attention has been devoted to the physical security of nuclear installations.

Less urgent, but no less important, is the desire by the nuclear emergency management community to better master response during the mid-term of a nuclear accident. This period follows the urgent phase before a release and continues until the accident facility is brought under control and releases end. The characterisation of contamination deposition may not be fully complete at the beginning of this mid-term phase, but urgent countermeasures (e.g. evacuation, sheltering and the use of stable iodine) have been implemented as demanded by the urgent accident phase circumstances. During this period, agricultural aspects will be increasingly important, and the involvement of stakeholders in decision-making processes will be significant. Evacuees will want to return to their homes and businesses; individuals from the affected areas will wish to know with certainty their exposures and risks; cleanup activities will begin and corresponding waste will need disposal. A multitude of practical questions will arise during this period, and policy, structural and procedural aspects of mid-term emergency planning must be in place for governments to respond appropriately. As mentioned earlier, social trust in government as well as its institutions and

officers could well be threatened should mid-term responses inadequately address the needs of stakeholders. For this reason, nuclear emergency management specialists are now focusing on identifying the details of the types of issues that will arise, and on developing effective implementation processes and structures for their resolution.

### **Forthcoming NEA activities on nuclear emergency management**

The NEA Committee on Radiation Protection and Public Health (CRPPH), through which the INEX exercises have been organised and analysed, is addressing some of the above-mentioned issues through its Expert Group on Nuclear Emergency Matters. The CRPPH is focusing its efforts on developing nuclear emergency exercises to assist response organisations to better meet the needs of their national decision makers and has entrusted its Expert Group with designing the INEX 3 exercise. Although not yet finalised, this exercise will be a table-top exercise, similar to INEX 1. The scenario to be used will involve a significant contamination "footprint" from an unspecified source, and the actions taken and results of the urgent response phase will be documented as a starting point for the exercise. The focus of INEX 3 will then be on response to agricultural issues arising as a result of the contamination. Depending upon the interests of the country participating in the exercise, some urban contamination issues, again in the mid-term phase, may also be addressed. As this is a table-top format, countries can perform the exercise individually, or with neighbouring countries, depending upon their strategic national objectives. Current plans call for the exercise to be organised in late 2004 or early 2005, and to take place over a period of a few months. A workshop will then be organised to present, compare and analyse national exercise summary reports, and to draw out common lessons and conclusions.

It is hoped that through these efforts, national planning and preparation for the management of nuclear emergencies will continue to improve to better serve the needs of decision makers, and to allow stakeholder needs and concerns to be addressed in a fashion that builds trust and confidence in government. ■