

The IAEA's emergency assistance services

*Report on the development and procedures
of an improved emergency response system*

by E. Asculai and H.E. Collins

Since 1959, the Agency has had a relatively simple action plan by which it would, upon request, arrange to provide assistance to any Member State following an accident involving radioactive materials. This plan may have been adequate for relatively small, localized emergencies. However, it was never called upon to mobilize the Agency for responding to accidents involving nuclear power facilities or relatively extensive radiological emergencies involving radioactive materials.

The concept of having such an Agency plan was basically sound, but it was never seriously put to the test of responding to a real accident or emergency such as those which have occurred in recent years. The number of nuclear facilities and the use of radioactive materials have expanded to the statistical point where accidents and emergencies are occurring with increasing frequency. This requires a re-evaluation of the Agency's role and obligation to provide assistance when requested or, in the absence of a request, when it feels morally obliged to offer its "good offices" regarding assistance.

Since 1979, concern about an adequate emergency planning and preparedness posture on the part of Member States and the Agency was manifested by accelerated activities in this specific area and in nuclear safety and radiation protection in general. These activities occurred after the two most serious nuclear accidents of record at the Three Mile Island (TMI) and Chernobyl nuclear power plants. TMI ultimately resulted in direct action by the Agency's Board of Governors and the Secretariat leading to two advisory documents.* Chernobyl resulted in the adoption in 1986 of the *Convention on Assistance in the Case of a Nuclear*

Accident or Radiological Emergency and the *Convention on Early Notification of a Nuclear Accident*, both of which were based on the two advisory documents issued after TMI. These Conventions levy specific obligations and responsibilities on States Parties and on the Agency.

Recent experience

In 1987, a serious radiological emergency involving a radioactive source (caesium-137) occurred in Brazil. The emergency, in aspects related to its causes, was remarkably similar to one involving a cobalt-60 source which took place in Mexico (and via transport of contaminated materials to the United States) about 4 years earlier. Other serious radiological emergencies, some less well-documented and some with fatalities or serious injuries, have occurred in other countries. In the Brazilian case, the Agency was requested to provide various types of assistance. Brazil also requested and accepted assistance on a bilateral basis from several Member States. The Mexican case was largely handled through bilateral activities between Mexico and the United States.

Recent experience and "lessons learned" in serious emergencies involving nuclear and radioactive materials dictate the necessity to have improved response schemes and an international infrastructure to assist in mitigating their consequences. Greater efforts are underway to prevent accidents within the international nuclear safety and radiation protection communities. Nonetheless, it is still prudent to be prepared. To respond more effectively to such accidents and emergencies at the international level, the IAEA has launched a project called "emergency assistance services". The heart of these services is an *emergency response system* (ERS) currently under development.

Emergency response system (ERS)

The main objectives of the ERS derive from the Agency's responsibilities and functions under the two Conventions cited earlier. They are:

- upon receipt from a State of a notification of an accident, to inform States Parties, Member States, and other

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* INFCIRC/310, "Guidelines for mutual emergency assistance arrangements in connection with a nuclear accident or radiological emergency" and INFCIRC/321, "Guidelines on reportable events, integrated planning and information exchange in a transboundary release of radioactive materials".

States which may be physically affected by a release of radioactive material that occurs, or is likely to occur, and that has resulted, or may result, in an international transboundary release of radioactive material that could be of radiological safety significance for another State; and to inform relevant international intergovernmental organizations of such notification.

- to promptly provide the affected States, any requesting State Party, Member State, or relevant international intergovernmental organization with available information relevant to minimizing the radiological consequences in affected States.

- to assist in the process of limiting the consequences of an accident by providing or obtaining equipment, materials, manpower, and other assistance as found necessary upon request. The resources for this kind of operation are to be supplied by the IAEA and its Member States.

In most cases, the Member State involved is expected to initiate any assistance by requesting it. In some cases, however, a situation might arise in which the Agency should offer its "good offices" regarding assistance even though no request has been made.

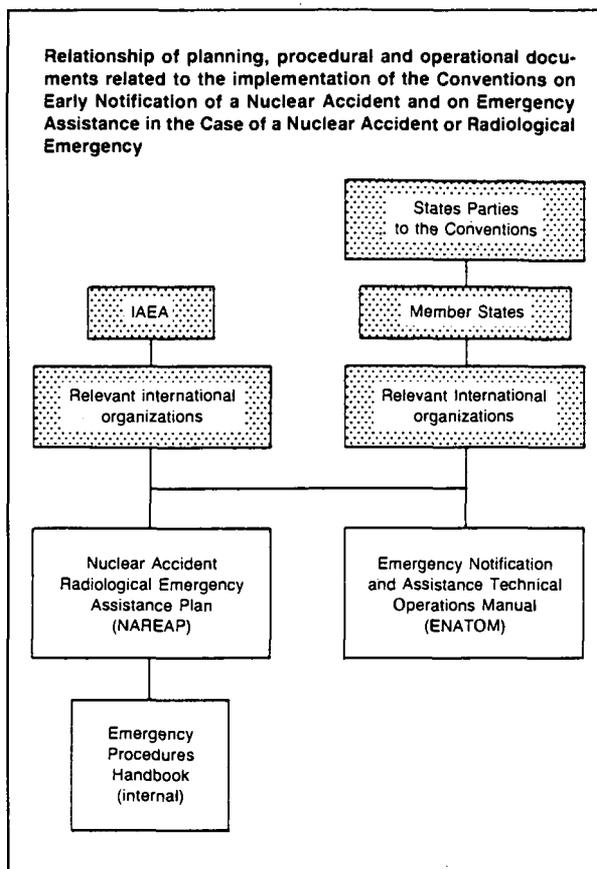
Elements of the system

The Agency has defined and is developing the planning, procedural, and operational documents necessary to assist it and its Member States in implementing the various responsibilities and functions under the two Conventions in the case of an accident or emergency. These documents are:

- **Nuclear accident/radiological emergency assistance plan (NAREAP).** This plan provides the foundation for maintaining and activating the Agency's *emergency response system*. It is considered to be a document for internal Agency use to provide the relevant staff with basic information to enable an effective response. It is also intended that this plan provide a basic conceptual framework of planning assumptions; concept of operations; organization and responsibilities; communications; data acquisition, handling and dissemination; administrative, technical, and general support; co-ordinated training and exercises; plan maintenance, review, and revision; and an introduction to internal procedures for implementation. Its scope encompasses nuclear accidents and radiological emergencies referred to in the Conventions. It also encompasses what are called "Agency-related accidents or emergencies".* The plan's application is limited to the *internal operations* of the Agency. It is not intended to interfere with, or be extendable to, the domestic emergency response

* These involve Agency activities, as well as any calls for assistance and any "incidents" or "occurrences" (events) which may be of interest to the Agency and wherein it might consider "offering its good offices" in keeping with the intent of the emergency assistance Convention.

Relationship of planning, procedural and operational documents related to the implementation of the Conventions on Early Notification of a Nuclear Accident and on Emergency Assistance in the Case of a Nuclear Accident or Radiological Emergency



obligations and responsibilities of States. Any emergency response activities undertaken by the Agency in accordance with this plan and its supporting documents will be oriented towards "best efforts". It will also be oriented towards a consideration of risk or hazard to Agency staff and any Agency recruited experts who may be requested to go to the scene of an accident or emergency.

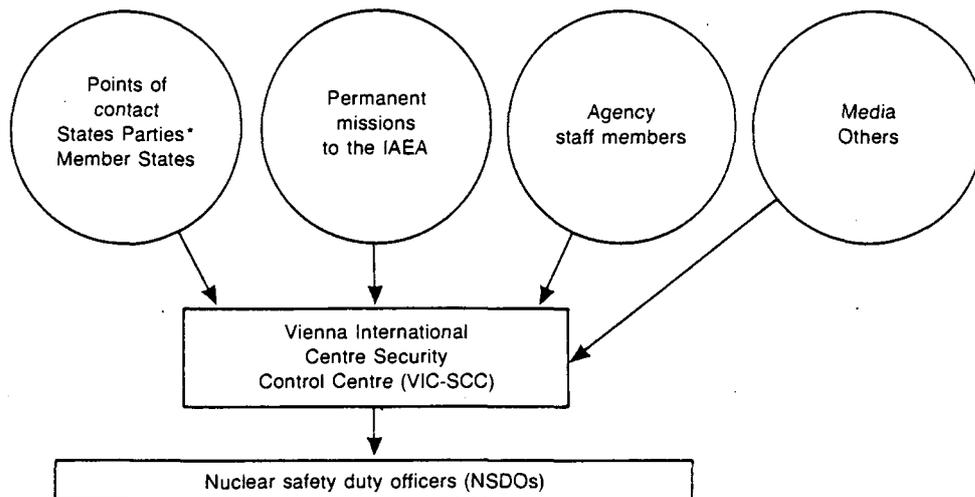
- **Handbook of emergency response procedures.** This procedural document supports NAREAP with detailed internal emergency response operational procedures to activate and deactivate the ERS. It is for the use of the involved Agency staff and contains procedures governing such things as communications, notifications, activation and call up of the Agency's emergency response team, training, exercises, and obtaining and rendering assistance. The handbook also addresses maintenance of the ERS.

- **Emergency notification and assistance technical operations manual (ENATOM).** This manual conceptually links the Agency, relevant international organizations, States Parties, and Member States under the provisions of the Conventions. ENATOM will be distributed to competent authorities involved. It will contain the text of both Conventions, along with practical operational suggestions based on internal Agency procedures for notification of a nuclear accident or radiological emergency and for offering or requesting

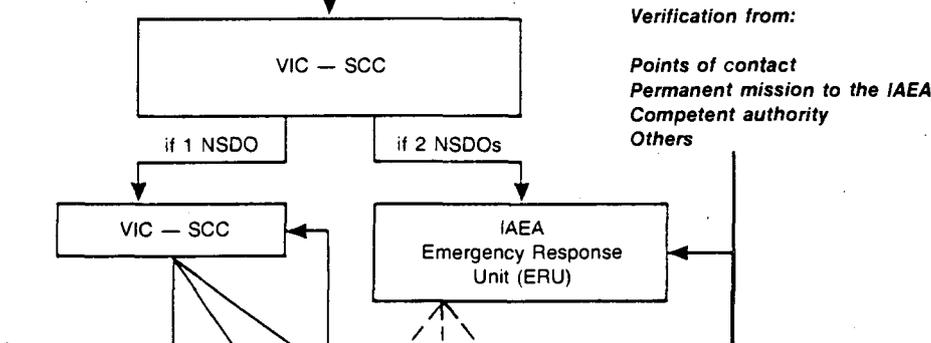
IAEA's Emergency Response System (ERS)

Sources of incoming information

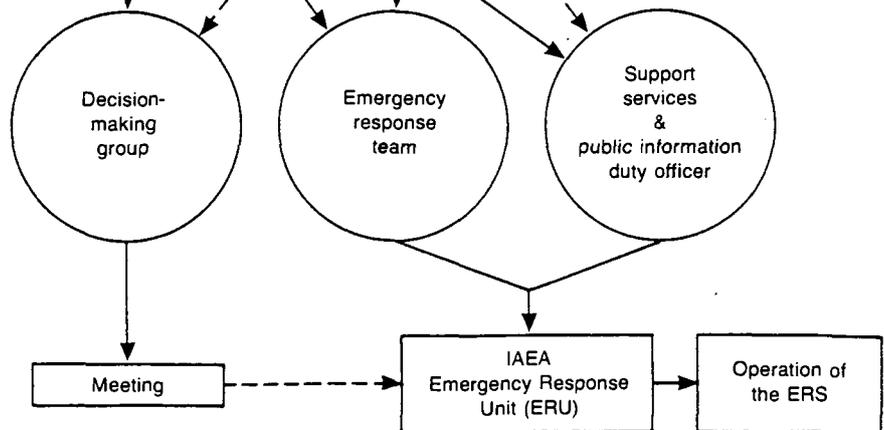
PHASE I:
Analysis
of
messages



PHASE II:
Verification
and
decision
to
activate ERS



PHASE III:
Activation
and
Operation



Note: The ERS may be activated directly by the VIC-SCC in cases when only one NSDO is reached; the ERU activates the ERS when two NSDOs are reached.

assistance. It will also contain information and guidance on communications with the Agency, relevant international organizations, and Member States; description of the Agency's role and capability in "brokering" assistance; information concerning experts, equipment, materials, and services which could be made available by Member States and relevant international organizations; information on the Agency's NAREAP and the ERS; abstracts of all Agency emergency planning and preparedness, and radiation protection technical guidance publications; information on specialized national and regional medical centres worldwide collaborating with the World Health Organization (WHO); and information on points of contact and competent authorities as required by the Conventions.

The development and distribution of ENATOM should particularly facilitate the practical implementation of those Articles of the two Conventions which are operational in nature.

Organization of the ERS

The organizational concept for the ERS is to maintain a small permanent two person staff. One professional is designated as co-ordinator of emergency assistance services and one technical assistant maintains the administrative and technical aspects of the system. These are embodied in NAREAP and its attendant procedures, ENATOM, and the emergency response unit (ERU), which is the physical and communications focal point of the system. During activation of the system, other staff are also involved. When the ERS is not in activation, the focal point for initial notification of an accident or emergency to the Agency will normally be the United Nations Vienna International Center, Security Control Center (VIC-SCC). (*See accompanying diagram.*) The organization includes:

- **Nuclear safety duty officers (NSDOs).** To ensure the ERS's readiness, two IAEA staff members will be assigned as "nuclear safety duty officers" (NSDOs). They will be on call at all times via telephonic pagers for one week of duty. NSDOs are to be alerted by the VIC-SCC or by any other means, depending upon the source of information regarding a nuclear accident or radiological emergency. The NSDOs are responsible for activating the ERS and the ERU.

- **Emergency response team (ERT).** An emergency response team (ERT) is to man the ERU when activated by the two NSDOs on duty. The ERT consists of the co-ordinator, emergency assistance services, the two on-duty NSDOs, the ERU technical assistant, two secretaries/telephone operators, a telex operator, and an operator for the Global Telecommunications System (GTS) of the World Meteorological Organization (WMO). This team may be joined by professional staff members who are experts in various fields related to the accident or the emergency. The ERT will be responsible for the technical operation of the ERU during an activated status.

- **Decision-making group (DMG).** A decision-making group (DMG) will be activated as required by the nature of the event. The core team of the DMG will consist of the Director General; the Deputy Director General (DDG), Department of Nuclear Energy and Safety; the DDG, Department of Administration; the DDG, Department of Technical Co-operation; the Director, Division of Nuclear Safety; and the Head, Radiation Protection Services Section. Additional management staff from other departments and divisions may be added to the DMG as required.

- **Support services.** Support services may be necessary to help maintain and operate the ERS, especially if the system has to function for an extended round-the-clock period. These services will be drawn from the appropriate IAEA departments and divisions as required.

- **Public information duty officers.** The IAEA's Division of Public Information will be responsible for the co-ordination and dissemination of information about the Agency's response to accidents, emergencies, and incidents. A public information duty officer will also be on call at all times, via a telephonic pager. He will assist the NSDOs as required during the activation of the ERS and ERU. After activation, he will work with the decision-making group concerning public media activities related to the event.

Emergency response unit (ERU)

The Agency established an emergency response unit (ERU) to fulfill its obligations, mainly those which come under the two Conventions. Two main types of activities are required of the ERU: (1) receiving and disseminating information provided or requested by Member States during the acute stages of a nuclear accident; and (2) providing or obtaining assistance in response to requests from Member States.

To cope efficiently and intelligently with these requirements, the ERU must establish and maintain an emergency assistance resource database; develop and maintain the software for handling and analysing radiological monitoring results and the characteristics of the accident source; and develop the mechanisms for handling and analysing the results of model predictions.

From a technical standpoint, the ERU must have a communications and data handling capability; resource databases; analysis methodology; and ERU and ERS operational procedures.

- **Communications and data handling capability.** The ERU communications systems facilities are designed to access, and be accessible to, the specified points of contact and other official channels of States Parties and Member States. The communications facilities include: telephones (including recording of conversations) with direct international dialling and automatic dialling facilities; telex (both transmission and reception); telefax (transmission only); electronic mail; and access to WMO's GTS. The GTS is to be used for the rapid transmission of a large volume of data to many points when



View of the IAEA's emergency control room, adjacent to a smaller computer room. The control room is staffed by the Coordinator of Emergency Assistance Services and a Technical Assistant, shown here. Supporting equipment includes a telephone system, telex and telefax, a computer system, and transmissions for the Global Telecommunications System (GTS) of the World Meteorological Organization (WHO). (Credit: Katholitzky for IAEA)

the distribution of information is unrestricted. Also included are in-house telephone and intercommunications systems. The Agency's computer section is further preparing a computerized file management system, designed to facilitate the rapid retransmission of the data while, at the same time, performing quality assurance checks of the data and storing it in files for future analysis.

● **Resource databases.** As previously mentioned, the ERU must establish and maintain several resource databases. These include, *inter alia*, the listing of all national competent authorities and contact points, including communication instructions; the information from Member States regarding potential resources for emergency assistance; reactor data; and radiation protection reference data.

● **Analysis methodology.** The Agency intends to create a modest analysis capability for situation assessment and quality assurance of data. The data for this analysis is

expected to come from the information supplied by Member States and international organizations if an accident occurs. A methodology is being developed to produce area maps of external radiation fields, gross or specific isotopic air concentrations, ground deposition concentrations, and time histograms of these data for specific locations or areas. These outputs will assist the Agency to evaluate the radiological situation and to advise Member States which do not have the facilities for data handling and analysis when they have requested this information.

● **ERU and ERS operational procedures.** The technical operations systems necessary for routine and emergency conditions are based on emergency response procedures. Technically, they will include: a log book facility (both hand-written and electronically recorded); an NSDO computer system which will have a duty officer check list for the activation of the ERS and ERU; all important databases, including facilities for quick sorting and retrieving essential data (e.g. which countries have medical facilities for radiation injuries, which can supply monitoring teams); and the principle procedures for all communication systems. All electronic files have written backup files to be used in cases of electrical or computer failures.

Implementation of the ERS

All major elements of the ERS are scheduled to be developed and in place by the end of 1988. The ERS is being developed by an IAEA Intergovernmental Review Group under the Chairmanship of Mr Dipak Gupta, Special Advisor in the Department of Nuclear Energy and Safety. The system's full implementation is scheduled for 1989, after appropriate training of involved Agency staff and after conducting a comprehensive exercise to test the system. Manpower in terms of the services of skilled professionals to assist the Agency in preparing the many operational procedures required for the ERS has been supplied by some Member States at the IAEA's request. The preparation of these procedures is essential for the full implementation of the ERS.

