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IEC Conducts Full Response Exercise

On 28 March, the Incident and Emergency Centre (IEC) conducted its first Full Response Exercise of 2012. Over 30 staff members from the Department of Nuclear Safety and Security and the Division of Public Information participated.



During the full response exercise, the technical team discusses the radiological consequences of the simulated emergency release of radioactive material.

The IEC was activated into full response mode at approximately 9 a.m. This full response lasted most of the day and led up to a ‘lessons learned’ discussion at the end of the day. Florian Baciu, the IEC Response System Coordinator, noted: “Although many of the participants were involved in the IAEA response to the accident at TEPCO’s Fukushima Daiichi nuclear power plant, this exercise gave them the opportunity to practice procedures which they had not used since then. In addition, we had several staff members relatively new to the IAEA’s Incident and Emergency System among the participants.”

Hilaire Mansoux, one of the Emergency Response Managers for the exercise, stated: “The scenario was quite complex, requiring a good flow of information.” The IEC staff had developed a scenario in which a meltdown and resulting release of radioactive materials to the environment from a nuclear power plant in a Member State was caused by a criminal act. All outside organizations were represented by the IEC staff in a simulation cell, which periodically contributed information using telephone calls, faxes, emails and messages through the IAEA’s Unified System for Information Exchange in Incidents and Emergencies (USIE).



Hilair Mansoux, an Emergency Response Manager for the exercise, briefing Elena Bulgova, Head of the IEC.

The tasks of the IAEA in the area of emergency response were expanded through the mandate given by Member States following the events at Fukushima Daiichi last year. In the area of communication and information dissemination, the IAEA was also given, among other tasks, the mandate to assess emergency situations by providing “analysis of available information and prognosis of possible scenarios” (IAEA Action Plan on Nuclear Safety, <http://www.iaea.org/About/Policy/GC/GC55/Documents/gc55-14.pdf>).

Together with other matters, the assessment aspect was addressed in this full response exercise.

Further full response exercises are being planned for June, October and November 2012, along with other, smaller exercises, drills and refresher training sessions throughout the year.

Assistance Missions in Early 2012 – Cambodia, Peru and Trinidad and Tobago

Following the receipt of requests for assistance, IAEA assistance missions with the involvement of the Response and Assistance Network (RANET) were dispatched to Cambodia, Peru and Trinidad and Tobago in the first two months of 2012.

The IEC organized an IAEA assistance mission to recover radioactive sources used for brachytherapy purposes in Cambodia after receiving a request from the authorities. The need for recovery occurred when the operators were not able to retract the sources in the safe position in an old brachytherapy machine. No overexposure of medical staff or patients had occurred at the hospital where the machine was located. Mr. Juan Carlos Benítez of the Division of Nuclear Fuel Cycle and Waste Technology was the team leader for this mission, which was conducted with the involvement of the Australian RANET source recovery team. In agreement with the counterparts in Cambodia and Australia, the mission went forward after preparations had been taken: a radiation container for the sources to be recovered was provided by Australia and shipped to Cambodia. Careful planning preceded the recovery operations, which were quick and effective. The sources were retracted in the safe position in the brachytherapy machine and, with the agreement of the counterpart in Cambodia, the brachytherapy machine was set out of operation.

The request for assistance from Peru required urgent action. Three workers involved in industrial radiography had received significant exposures while working with a

radioactive source in an unshielded position. At the request of Peru, the IAEA launched an assistance mission for the provision of expert medical advice – only 24 hours after receipt of this request. This IAEA assistance mission was led by IEC staff Mr. Rodrigo Salinas, who, together with medical specialists from the RANET registered capabilities in France from the Institut de radioprotection et de sûreté nucléaire and Hôpital d’instruction des armées, Percy, provided specialized medical advice to the counterpart in Peru. The assistance mission was completed in four days. The counterpart in Peru followed with a request for specialized medical treatment for the most exposed patient. Thanks to a cooperative effort in which the USA covered the financial cost of medical treatment, the Peruvian patient was transferred to the specialized facility of the Hôpital d’instruction des armées in Percy, France, and treatment was administered starting on 6 February 2012.

In Trinidad and Tobago, Mr. Ola Holmberg of the Division of Radiation, Transport and Waste Safety (NSRW) led an assistance mission that involved a medical RANET team from REAC/TS, USA. Staff from the IAEA’s Division of Human Health and the Pan American Health Organization also took part in this mission, which was aimed at investigating the health status of a number of patients who had been subjected to accidental overexposures during medical treatment of cancer some years ago. The team spent five days in Trinidad and Tobago and examined 30 patients selected for medical examination by the authorities of that country. As agreed in the

Assistance Mission Plan, at the end of the mission the team leader handed over a final report on its observations to the counterpart, the Ministry of Health of Trinidad and Tobago. The groundwork for this assistance mission had started in 2011. However, as provision of the requested assistance was not urgent, the counterpart in Trinidad and

Tobago made the necessary preparations and the assistance mission was deployed in February 2012.

Findings from the Assessment of EPREV and Self-Assessment Reports

The Emergency Preparedness Review (EPREV) is a service provided by the IAEA to independently appraise preparedness for a radiation incident or emergency in Member States. This service, which has been available since 1999, had been delivered to 21 Member States up to the end of 2011, with follow-up missions in Indonesia in 2004 and Qatar in 2010.

With a view to maximizing the benefits of these missions, the IEC has developed a database of the recommendations, suggestions and good practices arising from the EPREV and self-assessment reports. The information gathered will be used to analyse the level of compliance of different national arrangements for emergency preparedness and response (EPR) with the requirements of international standards in the area of EPR.

This analysis will allow, inter alia, the determination of areas that call for further attention by the IAEA and Member States to meet the requirements of *Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GS-R-2). The data will also be useful for gathering feedback by IAEA staff and international experts involved in the conduct of EPREV missions, with a view to further improving the service, preparing for follow-up missions and providing information on areas with observed weaknesses or non-conformance with the IAEA safety standards. The good practices in the database will be made available to promote the sharing of experience and good practices among Member States.

Following a review of the EPREV and self-assessment reports, the following common areas of insufficient compliance were pinpointed in Member States:

- Identification and clear allocation of functions and responsibilities of all stakeholders in the emergency response system at the local, provincial and national levels.
- Establishment/improvement of on-site, off-site, local and national plan (National Radiation Emergency Plan) based on an all hazard approach and development of a complete set of supporting procedures specifically for initiation and implementation of off-site response.
- Performance of threat assessment according to the requirements of IAEA Safety Standards Series No. GS-R-2.
- Awareness of radiation issues among scrap metal dealers and national border control authorities and effective system of monitoring at national borders.
- Systematic, effective and regular training programme for all first responders:
 - Availability of sufficient number of trained personnel in all response organizations.
 - Provision of effective personal monitoring services, especially internal monitoring for all designated radiation workers.
- Establishment of generic criteria and operational intervention levels (OILs) for decision making on urgent protective actions and for taking agricultural countermeasures, countermeasures against ingestion and long term protective actions.
- Establishment of national level capabilities for effective medical management of exposed or contaminated individuals in radiation emergencies.
- Development of a national policy for public information and for communication with national and international organizations.
- Arrangements for mitigating the non-radiological consequences of a radiation emergency.

Workshop on Protective Actions for a Severe Reactor Accident

On 12–16 March, the IEC hosted a workshop in Vienna for Member States with nuclear power plants or located near nuclear power plants. The aim of the workshop was to assist Member States in developing an adequate capability for protecting the public in the event of a severe accident at a nuclear power plant or spent fuel pool based on guidance and tools developed by the IAEA.



Scientific secretary Thomas McKenna giving an introduction and welcome speech to participants.

Altogether, 36 participants from 26 countries attended the workshop, representing 85.5% of the world's operating nuclear power reactors. The following countries participated: Argentina, Armenia, Austria, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Czech Republic, Finland, France, Germany, Hungary, Islamic Republic of Iran, Republic of Korea, Japan, Pakistan, Romania, Russian Federation, Slovakia, Slovenia, Spain, Turkey, Ukraine and United States of America.

The workshop trained participants in applying the IAEA tools, training materials and guidance that are available to Member States for responding to a reactor or spent fuel pool emergency. It reviewed the actions to be taken to protect the public in such an emergency and advised participants on the actions to be taken based on plant conditions before or shortly after a release of radioactive material. The workshop also addressed OILs that can be applied immediately during an emergency to determine if protective actions are needed, based on measurements taken after a release. The workshop consisted of a series of lectures, dedicated activities, a tabletop exercise and group discussions. The main modules of the workshop were:

- Reported units and possible health effects following an emergency at a nuclear power plant;
- Overview of emergencies at a nuclear power plant;
- Environmental characteristics of a release from an emergency at a nuclear power plant;
- Public and media response to an emergency at a nuclear power plant;
- Generic and operational criteria for a response to an emergency at a nuclear power plant;

- Threat to the public from an emergency at a nuclear power plant;
- Strategy for protecting the public in an emergency at a nuclear power plant;
- Medical screening and decision making for an emergency at a nuclear power plant.

Participants demonstrated great interest in a new tool provided for dealing with the large number of measurements reported during an emergency at a nuclear power plant. This tool came in the form of charts for units such as Sv/h, cps and Bq/kq, which provide a comparative perspective of the potential health effects of radiation that can easily be communicated to the public. Participants were keen on seeing these charts made available for use in their own countries.



Workshop participants discussing strategy during the tabletop exercise.

A highlight of the workshop was the tabletop exercise as an opportunity for participants to work together and apply the concepts learned during the lectures and dedicated activities. In the exercise, participants were divided into groups and acted as off-site decision makers responsible for protecting the public and responding to an emergency at a nuclear power plant in their country. At intervals, the groups were provided with exercise scenario updates on the situation at the nuclear power plant and on off-site developments. Each group was also required to provide a briefing on the emergency to the other groups, who acted as media representatives, and to answer questions. The tabletop exercise provided participants with the experience of taking decisions, while only having limited available information to rely on during an emergency at a nuclear power plant.

Due to the extensive interest of participants, plans were made to host regional workshops on protective actions for a severe reactor accident—in English, Russian and Spanish—at a later date. Participants were also informed that IAEA staff can provide a similar workshop and individual briefings for decision makers at the request of their countries. The basic tools that are needed for responding to an emergency and that were addressed during the workshop will be made available on the IAEA web site in the course of 2012.

Extension of RANET Capabilities under the IAEA Action Plan on Nuclear Safety

Although RANET was not used in response to the accident at TEPCO's Fukushima Daiichi nuclear power plant in Japan, subsequent evaluation of the event by the IAEA and Member States identified areas where RANET can be enhanced. These have been described in the IAEA Action Plan on Nuclear Safety, which includes the following sub-actions: *The IAEA Secretariat, Member States and relevant international organizations to strengthen the assistance mechanisms to ensure that necessary assistance is made available promptly. Consideration to be given to enhancing and fully utilizing the RANET, including expanding its rapid response capabilities.*” and *“Member States to consider, on a voluntary basis, establishing national rapid response teams that could also be made available internationally through RANET.”*

The IAEA convened a consultancy meeting on the extension of RANET capabilities under the IAEA Action Plan on Nuclear Safety at IAEA Headquarters, Vienna, Austria, from 31 January to 2 February 2012. The purpose of the consultancy was to: discuss the enhancement of RANET pursuant to the Action Plan, agree on the methods to implement these enhancements and encourage Competent Authorities to register their National Assistance Capabilities under RANET. All States that had registered their capabilities in RANET were invited to attend, along with a number of States operating nuclear power programmes, on the basis of regional distribution and known assistance capabilities. A total of 36 participants from 20 Member States attended the meeting. The meeting was divided into four sessions:

1. Assistance in a Nuclear Emergency: Lessons Learned
2. Extension of RANET Capabilities
3. Ensuring Timely Provision of Assistance
4. Increasing Registration in RANET (Assistance Capabilities and Challenges to Register).

Each session included presentations by representatives of Member States and the IAEA, and Sessions 2-4 concluded with workshop discussions that allowed participants to discuss the information presented in the session as well as contribute new ideas to help facilitate the development of actions and conclusions.

In total, 15 meeting conclusions were agreed upon by the participants along with additional considerations for action by the IEC. Some conclusions of the meetings were as follows:

- RANET has been effective in providing international assistance.
- There is a need to fully utilize RANET, as envisaged by the Assistance Convention. The IEC should include, within the functional areas of RANET, assessment and advice to competent authorities on on-site response activities to mitigate the impact of emergencies at nuclear facilities.
- It is important that countries, in particular countries with nuclear power programmes, develop and maintain national response capabilities and arrangements commensurate with identified hazards that can possibly be offered for international assistance.
- States should establish and maintain arrangements for offering/delivering international assistance as well as for requesting and receiving international assistance.



Participants during the consultancy meeting.

- Preparedness for providing and receiving assistance should be a part of the preparedness to respond to emergencies.
- The RANET mechanism does not and will not at any time replace national/State responsibility in emergency preparedness and response.
- Member States should ensure awareness of RANET within their national structures and promote its use and development.

The conclusions and actions from the meeting were presented, for information, to the 6th Competent Authorities Meeting, held in Vienna from 17 to 20 April 2012.

Member State Preparedness

In assisting Member States in applying IAEA guidance in the area of emergency preparedness and response, the following training events were conducted during the first quarter of 2012:

- Regional training course in emergency preparedness and response for States embarking on the use of nuclear power (Austria, Vienna, 16–20 January);
- Sub-regional progress review meeting on developing national arrangements and capabilities for preparedness and response to a nuclear and radiological emergency (Austria, Vienna, 27–29 February);
- Regional training course for medical response to a radiation emergency (Dominican Republic, Santo Domingo, 12–16 March);
- Training course on first response to a radiation emergency (Slovenia, Ljubljana, 19–22 March);
- Sub-regional workshop on conduction of exercises to test preparedness for nuclear or radiological emergency (Austria, Vienna, 26–30 March).

Also during the first quarter of 2012, the IEC conducted two EPREV missions in Croatia (26–30 March) and Bosnia and Herzegovina (5–9 March).

Upcoming Activities

The following events are planned to be conducted over the next six months:

- National workshop and exercises on first response (Belarus, 2–6 April and 14–25 May);
- Meeting on update of laboratory protocols, inter-comparison exercises and standards (LBDNET) for the Latin-American network of biodosimetry (Chile, Santiago de Chile, 4–8 April);
- National training course on medical response to radiation emergencies (Bolivia, La Paz, 9–13 April);
- Latest emergency preparedness and response arrangements and capabilities (Austria, Vienna 16–17 April);
- Workshop on sharing lessons identified from past responses and exercises (Austria, Vienna, 23–27 April);
- National training course on application of the requirements (GS-R-2) and guidance on developing national capability for response to nuclear or radiological emergencies (Costa Rica, San Jose, 23–27 April);

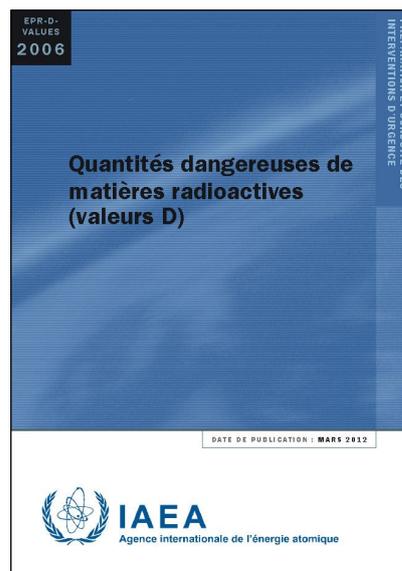
- Regional workshop on emergency preparedness and response on dose assessment (Indonesia, Jakarta, 21–25 May);
- Training course on emergency consequence management (Austria, Vienna, 21–25 May);
- National training course on application of the requirements (GS-R-2) & guidance on developing national capability for response to nuclear or radiological emergencies (Paraguay, Asuncion, 21–25 May);
- National training course on first response to radiological emergencies (Venezuela, Caracas, 21–25 May);
- Training course on first response to a radiation emergency during a major public event (Austria, Vienna, 4–8 June);
- Workshop on the highlights and lessons learned from EPREV missions (Austria, Vienna, 25–29 June);
- Regional training course on generic procedures for response to a nuclear or radiological emergency at research reactors (Russian Federation, Dimitrovgrad, 27–31 August);
- Regional training course on public communications in radiation emergencies (Botswana, Gaborone, 25–29 June);
- Training course on medical response to radiation emergencies (Austria, Vienna, 9–13 July);
- Workshop on considerations in emergency preparedness and response for Member States embarking on a nuclear power programme (Phase 2) (Austria, Vienna, 16–20 July);
- Regional workshop on assessment of source term (Slovakia, Bratislava, 22–28 September);
- Regional training course on application of the requirements (GS-R-2) & developing national capability for response to a nuclear or radiological emergency (United Arab Emirates, Abu Dhabi, 23–27 September);
- Workshop on strengthening regional capabilities for response to radiological and nuclear emergencies (Brazil, Rio de Janeiro, 24–28 September);
- Regional workshop on developing national radiation emergency plans (Estonia, Tallin, 25–29 September).

EPREV missions are planned to be conducted for Vietnam and Serbia (during the period of April and September). The IEC will also participate in IRRS missions to Greece and Slovakia covering the EPR module of IRRS.

Recently Issued EPR Publications

The French translation of *Dangerous Quantities of Radioactive Material (D-Values)*, *EPR-D-VALUES*, has been issued. The D-value is that quantity of radioactive material which, if uncontrolled, could result in the death of an exposed individual or a permanent injury that decreases that person's quality of life.

EPR-D-VALUES (2006) describes in detail the basis for the D-values given in *Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency* (EPR-METHOD, 2003), *Arrangements for Preparedness and Response for a Nuclear or Radiological Emergency* (Jointly sponsored by the FAO, IAEA, ILO, PAHO, WHO) (IAEA Safety Standards Series No. GS-G-2.1, 2006) and *Categorization of Radioactive Sources* (IAEA Safety Standards Series No. RS-G-1.9, 2005); it also provides an expanded set of D-values that includes other radionuclides that may be important in the event of a nuclear or radiological emergency.



http://www-pub.iaea.org/MTCD/Publications/PDF/EPR-D-values_F_web.pdf



http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1467r_web.pdf

Also recently published is the Russian translation of *Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency* (IAEA Safety Standards Series No. GSG-2). This Safety Guide presents a coherent set of generic criteria (expressed numerically in terms of radiation dose) that form a basis for developing the operational levels needed for decision making concerning protective and response actions. The set of generic criteria addresses the requirements established in IAEA Safety Standards Series No. GS-R-2 for emergency preparedness and response, including lessons learned from responses to past emergencies, and provides an internally consistent foundation for the application of radiation protection. The publication also proposes a basis for a plain language explanation of the criteria to the public and to public officials.

IEC News

The IEC welcomes Mr. Dirk Foster (USA) as Emergency Response Training Officer, Mr. Eduardo Luraschi (USA) as Outreach Officer (during the temporary absence of Ms. Lisa Berthelot), Ms. Gabriella Knoll (Hungary) as Team Assistant and Ms. Yoko Ueda (Japan) as Cost Free Expert.

Follow the history of emergency preparedness and response activities at the IAEA in the IEC Information Bulletin. This quarter, we look at the years 1957 to 1979. In the next issue, we will cover the years 1980 to 1986.

1957 IAEA set up as world's "Atoms for Peace" organization within the United Nations family

1959 Action Plan developed to provide assistance to Member States upon request following an accident involving radioactive materials

1963 IAEA issues publication *WP.35*, based on information provided by a number of Member States on the type of radiological assistance they could make available in the event of a radiation emergency in another country at the request of that State; publication subsequently revised in 1968 and 1971 with the participation of the **FAO, ILO** and **WHO**

1979 Three Mile Island accident: core meltdown at a nuclear power plant in Pennsylvania, USA

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