IMPLEMENTATION OF NEW POLICY AND PRINCIPLES OF HARMONISATION OF NUCLEAR EMERGENCY PREPAREDNESS IN CONDITIONS OF EMERGENCY RESPONSE CENTRE OF THE NUCLEAR REGULATORY AUTHORITY OF THE SLOVAK REPUBLIC

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1. Introduction

With respect to Chernobyl accident the changes in understanding of nuclear emergency preparedness have initiated a developing process resulting in an effective enhancement of conditions ensuring adequate response to nuclear or radiological accidents of emergency situations in many countries. The Slovak Nuclear Regulatory Authority (UJD) in frame of co-operations with IAEA, EC, OECD/NEA and other international organisations has actively participated in this challenging work targeting implementation of international experience and best practices in the country. The new international policy (principles declared e.g. in 'Memorandum of Understanding', IAEA, Vienna, 1997) based on experiences propagating importance of regional co-operation, harmonised approach and clear strategy for protective measures implementation in case of a nuclear or radiological accident has influenced the development also in Slovakia. The implementation process in the country was supported by changes in legal conditions regulating peaceful use of nuclear energy [1,2] including basic rules for emergency preparedness published in the second half of 1990 years.

2. Role of the Emergency Response Centre of the Nuclear Regulatory Authority of the Slovak Republic in nuclear emergency response preparedness

With respect to legal conditions [1] the Slovak Nuclear Regulatory Authority has established its own Emergency Response Centre (ERC) to have sufficient tools and means for an independent assessment of emergency situations and to be able to provide professional

recommendations to the authorities at national level. Legal, administrative and technical support enabling work of ERC have been implemented in compliance with principles of international approaches and at the same time taking into account national conditions for emergency management. Several projects of technical co-operation (IAEA, EC, bilateral with UK, US, Japan etc.) significantly accelerated this development and in the second half of 1990 the ERC was presented as a capable system supporting the nuclear emergency response in the country. The ERC has been integrated into the National Emergency Plan as a technical support centre for National Emergency Commission for Radiation Accidents (NECRA) and in direct and close co-operation with the Technical Advisory Committee of NECRA it is understood as a primary source of technical information for decision-making process during an emergency situation at national level. This position of the ERC enables to provide advices to the plant region on the development of the accident and on the countermeasures protecting the public through the NECRA. In case of serious severe accident situations ERC could provide an independent assessment also directly to co-ordinating local governments.

From technical and administrative point ERC also ensure the operation of international contact point (CP) with respect to conventions [3,4] signed by member states of IAEA and it is planned to provide a platform for integration with the notification system ECURIE of the European Union. With respect to EC project RODOS the ERC integrating the National Centre of RODOS system in the country should be part of this European system enabling prompt exchange of the data and prognosis results over the Europe region.

3. Administrative, technical and personal conditions of ERC

ERC uses modern technologies to keep the communication uninterrupted – keeping a fax and phone contact point 24 hours a day and 7 days in a week. The CP (also IAEA official CP) enables both domestic (including nuclear facilities) and international exchange of information. The on-line data transmission systems in real-time mode ensure effective acquisition of data necessary for ERC teams expert work. Transmitted data have been selected with respect to requirements of ERC emergency procedures and computer-based support systems. The volume of transmitted data is about one hundred technological data per unit (minutes sampling time), a few ten of data characterising radiation situation and local meteorological situation at the site (5 minutes sampling time) and broader meteorological (regional and Europe) data. The existing operational data acquisition system collecting technological and radiation monitoring data extended by local meteorological information, data from large area monitoring systems and meteorological networks increases the reliability

of results of computer based support systems in ERC. Legal, administrative and technical support enabling operation of ERC have been implemented in compliance with typical requirements implemented in several developed countries (e.g. France, Finland etc.). Basic conditions for a response in case of nuclear or radiological accidents are described in set of procedures for ERC. These procedures cover all functional responsibilities of the ERC and have been developed to support all activities of ERC staff and ERC operation. Besides of generic and organisational part, professional parts deal with all specific areas necessary to give comprehensive results on accident development. These documents include sufficient conservativeness and take into account availability of limited information (technological, radiological and in case of off-site impact also meteorological data) in case of an accident. The most important professional procedures are included in part of (III) Reactor Safety, (IV) Source Term, (V) Exposure and public radiation protection, (VI) Monitoring parts. The procedures have been developed on base of calculations (sequences) simulating severe accidents (and related events) using validated codes for VVER units (MARCH, MAAP4/VVER, MELCOR, RELAP etc.) and were mostly done by VUJE company.

The existing emergency plan, valid emergency procedures based on pre-calculated accident sequences and installed dynamic code packages as SESAME/VVER, ADAM, RTARC and the European RODOS system guarantee the credibility of processed information and reliability of results prepared for decision making process. With respect to operational modes of the ERC the activities are divided in three basic levels:

1. Monitoring level
2. Emergency level
3. Post-emergency level.

For all modes the ERC permanent staff has to fulfil various tasks necessary for verification of the correct functionality of the ERC equipment and procedures and at the same time has to maintain the staff capability to perform activities needed at any time. The basic structure of the ERC team is divided with respect to functional requirements into the following groups:

1. The Reactor safety group (RSG) is responsible for monitoring the status of the reactor plant and assessing for the possible accident development
2. The Radiation protection group (RPG) is assessing current radiological situation including the impacts of the releases of radioactivity on workers and members of the public

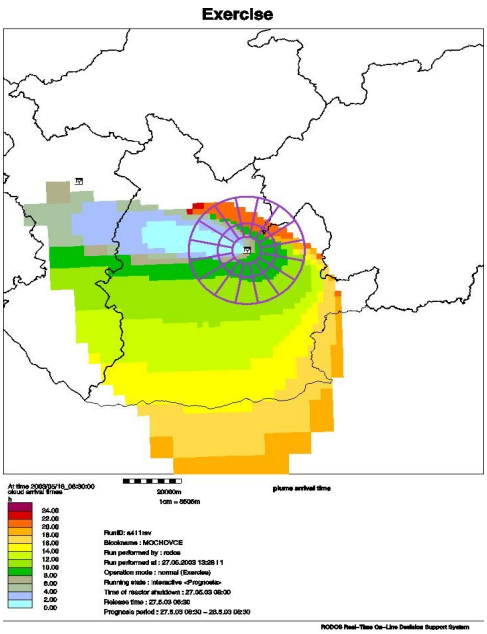
3. The Information group (IG) is coordinating the technical briefing material prepared by the RSG and Radiation protection group. It is also responsible for international information exchange
4. The Logistic group keep running the ERC and provides necessary support to other groups.

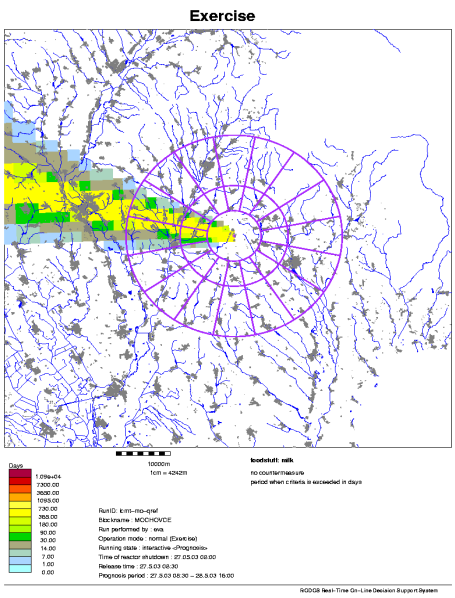
4. Regional and international co-operation and harmonization in the filed of emergency preparedness

One of the most important features of modern trends of emergency preparedness is the regional harmonization. Particularly in case of small countries, as it is typical in Central Europe and in Europe region, regional co-operation should be of a high importance. Effective communication and information exchange has been recognised as a key element of emergency plans. With respect to international conventions [3,4] and good relationships with neighbouring countries the Slovak Republic initiated and signed bilateral agreements with many countries to support pillars of a common co-operation in case of nuclear or radiological emergencies and strengthening co-operation in the field of preparedness. With respect to IAEA RER/9/050 and RER/9/064 common national trainers courses on IAEA methodology for emergency preparedness [5,6] and [7] were organised enabling sharing of experience between Slovak and Czech experts. Based on experience in the area several workshops were organised to present results and to share experience with countries from Eastern and Central European region (Armenia, Lithuania etc.). The Slovak Nuclear Regulatory Authority has been also active in hosting fellowship and scientific visitors from countries, where arrangements for emergency preparedness are under development. With respect to good co-operation with neighbouring countries a few proposals (‘Trilateral exercise’ – Slovakia, Hungary, Austria, Poland; ‘Vysegrad proposal’ - Slovakia, Hungary, Czech Republic, Poland) were prepared and agreed to improve the level of co-operation. These projects had to enable validation and comparison of national arrangements, including national plans for nuclear or radiological accidents, emergency procedures and support systems formally integrated in national arrangements, as well as testing of effectiveness of bilateral agreements between countries. These projects also had to contribute to the enhancement of public opinion and had to demonstrate progressive governmental policy and interest to increase the nuclear safety in the region.

5. International exercises - challenge for demonstration and validation of arrangements for emergency planning

The quality of technical and administrative conditions and level of training of ERC teams were several times tested during national and international exercises. Slovakia, Austria, Hungary and Poland participated in 'Trilateral' exercise 'DEKO2000'. The capability of ERC and National RODOS centre were appreciated when Slovakia was asked to prepare the 3rd DSSNET emergency exercise in May 2003. The exercise which dealt with the longer distance transport of radioactive material going beyond the distance range of about 200 km was the first exercise where such a large scale contamination was simulated with RODOS systems during an exercise. As an accident site the Mochovce NPP has been selected; the assumed plant accident, its progression and the source term information has been prepared in close collaboration between the utility and UJD. The exercise was prepared in a joint undertaking of UJD, VUJE and FZK Karlsruhe with input from the Slovak Hydro-Meteorological Institute a and Danish Meteorological Institute. To get maximum benefit and active participation a so-called cluster solution was implemented for the exercise: Europe region was subdivided into three groups of countries each representing a certain part of Europe. For each group, a weather situation was identified (recorded), which lead to a contamination of the countries belonging to this group. The trajectories of the weather situations for each group started at the accident site in the Slovak Republic. The accident and source term information was identical for each group. Some results of calculation are presented on next figures:





6. Conclusions

The principles of emergency preparedness in Slovakia fully support regional harmonisation and co-operation. Effective implementation of international practice and sharing of experience substantially contributed to the level of emergency response in the country and to the harmonisation of emergency response preparedness creating also conditions for an efficient regional integration.

[1] Act on peaceful use of nuclear energy 130/1998 Collection of laws
[2] Decree on emergency preparedness 245/1999 Collection of laws
[3] Convention on Early Notification of a Nuclear Accident, IAEA, Vienna 1987
[4] Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, IAEA, Vienna, 1987
[5] Method for the development of emergency response preparedness for nuclear or radiological accidents, IAEA-TECDOC-953, 1997
[6] Generic Assessment procedures for determining protective actions during a reactor accident, IAEA-TECDOC-955, 1997
[7] Generic procedures for monitoring in a nuclear or radiological emergency IAEA-TECDOC-1092, 2000