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**BASIC DATA OF
EMERGENCY RESPONSE CENTRE**

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BASIC DATA OF EMERGENCY RESPONSE CENTRE

Introduction

Emergency response centres have been established in the countries with developed nuclear technologies as a qualified support for the government (or a government-approved institution) and regional organs of the State Administration to offer a qualified help in their decision making in cases of nuclear emergency situation occurring on NPP. Such centres are equipped not only by the necessary methodical, technical and information means but they employ high-level professional personnel. The justification for creating such centres follows from the comparison of economic and social consequences of nuclear emergencies and the costs required for the establishment and running of these centres. The mentioned centres under the standard situation help to create a professional structure assuring permanent preparedness of a professional background and its continuous qualitative up to date development.

Emergency Response Centre (ERC) of Czech Republic is a highly specialised institution belonging to Nuclear Safety State Administration (SONS), which assures its activities both organisationally and technically. Main function of the ERC in the case of nuclear emergency is to fulfil the needs of SONS, Governmental Committee for Nuclear Emergencies in ÈR (GCNE ÈR) and the regional organs of State Authorities concerning the emergency planning and preparedness, evaluation of nuclear emergency consequences, including the emergency management and response.

In the case of major failure or accident on NPP, the ERC carries out the performance analysis and review of a given NPP. It also monitors the dosimetric situation and transfers the recommendation to GCNE ÈR, Regional Emergency Management Committees and to NPP.

The Emergency Response Centre is established as a professional workplace with permanent preparedness. It is set up by Nuclear Energy State Administration (SONS).

Professionally, the ERC cover the area of nuclear safety and radiation protection, namely:

- operational and emergency aspects of NPP
- distribution of radionuclides in the environment
- decontamination processes and emergency management

The function of ERC predominantly consist of:

- coordination of information flow
- acquisition, correlation and interpretation of technical and organisational data on emergency preparedness or on the emergency which already occurred.

Evaluation of emergency consequences

- notification or activation of selected bodies in the case of imminent nuclear emergency

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- preparation of proposals for protective measures and emergency management which are submitted to GCNE to enable their decision making in the case of emergency

In the course of its standard activity the ERC assures permanent preparedness, technically it fulfills the role of a liaison body and in cooperation with other organizations it supplies GCNE with information necessary for emergency management. The following aspects are of particular interest:

- creation and development of the database system concerning the emergency preparedness of the country
- proposal of preventive measures for the population, environment and property protection in the case of emergency,
- the time schedule of their implementation.

The role of ERC and the cooperating bodies in the case of nuclear emergency is seen in information acquisition for GCNE to enable the fulfillment of GCNE functions. These are in particular:

- decisions on population protection measures. If possible, these should be made before the occurrence of escape of radioactive substances into the environment of nuclear power plant
- assessment of efficiency of these measures from the viewpoint of prevention or reduction of emergency consequences upon population and environment

There are proposed the following system of ERC organisation:

- managing group
- information logistics group
- group evaluating the condition of nuclear energy equipment
- group for prediction, evaluation and emergency response

The managing group coordinates the activity of emergency response groups and on this basis it draws conclusions that are finally submitted to GCNE for making decisions.

The information logistics group ensures the data acquisition from the nuclear energy equipment under emergency. It is responsible for communication with other bodies involved in the emergency preparedness network, data transfer and their statistical evaluation. Technically, it assures the operation of ERC including the protection against unauthorised access to data.

The group evaluating the condition of nuclear energy equipment monitors the situation on the equipment under emergency state, carries out its safety diagnostics and makes prognosis about further development of the emergency. In the case of radiation emergency danger, the group makes predictions as to the extent of radiation source.

The activities of the group dealing with prediction, evaluation and emergency response will depend on the stage at which the emergency is occurring. If there is only a danger of radioactive contamination of the environment, the group makes a prediction of its consequences based upon the information given by the group evaluating the condition

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of nuclear energy equipment. If the escape already occurred, it analyses short and long term consequences of the escape and makes a more precise estimate about the source potential based on the results of dosimetric results. In more advanced stages the group deals mainly with the emergency response, namely by selecting suitable procedures for the elimination of consequences.

The assurance of operational activity of the ERC represents a multicomponent task involving methodology, software, technical means including the computing, telecommunication and audiovisual equipment, technical and software documentation, etc.

It will be necessary to work out the guidelines for individual ERC teams which would inform about the mode of utilization of given communication, computer equipment and software tools. Each software package will have detailed documentation which will describe the programme and its use to reach a required target. Methodical and software backing will be concerned namely with the following tools:

- Means used for obtaining the information on safety condition of nuclear energy equipment
- Means for evaluation and prediction of radiobiological consequences of accident
- Logistic, methodical and software tools

In the following text a basic specification of this software is given from the viewpoint of its utilisation for assuring the activity of ERC.

Means of Providing Information on NPP Safety

The following methodical and software means belong to this category:

- software for monitoring the nuclear equipment condition,
- software for monitoring the radiation situation within the nuclear facility,
- software enabling early detection of emergency situation,
- software for evaluating the condition of barriers and critical safety functions,
- software for emergency diagnostics and its further prediction.

The software enabling the monitoring the condition of nuclear equipment is an important tool for a detailed diagnostics of emergency and its localisation. This tool enables to display all the measured technological values from the primary and secondary circuit in a clearly arranged manner.

The software used for monitoring the on-site radiation situation should enable to display all the data from the dosimetric control system. Its purpose is:

- to localise the leakage points and the direction of contamination spreading,
- to assess the realistic operational possibilities which would prevent further aggravation of the situation and which would lead to the minimization of emergency consequences,
- to determine the escape routes for the evacuation of nuclear plant personnel,
- to determine the way of personnel protection during the repairs and rescue work.

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The software enabling a timely detection of emergency will help to ERC to identify the kind of emergency on the nuclear equipment. In some cases it will be possible to identify also the cause of the emergency. Methodically, the program will be based on the EFD (Early Fault Detection) approach which enables during a very short time period to carry out analysis of individual components of nuclear equipment or even to recognise its failure utilizing the real-time data.

The software used for the evaluation of condition of barriers and critical safety functions will evaluate the real-time technological and radiation data from the viewpoint fulfillment of critical safety functions and barrier ability to prevent the spread of nuclear fission products in the environment.

Means of Evaluation and Prediction of Radiobiological Consequences of Accident

Methodical and software tools for the evaluation and prediction of radiobiological consequences of accident will fulfil the following functions:

- display and updating the radiation situation in the vicinity of nuclear energy equipment,
- prognosis of activity concentration and radiation doses in the vicinity of nuclear energy equipment,
- calculation and display of radioactive cloud movement trace at changing meteorological conditions,
- reconstruction of the radiation source potential by using the dosimetric data within the nuclear facility and in its environment.

Logistic Methodical Tools and Software

The logistic part of software package will deal with all the necessary information and data serving to the optimization of emergency response in order to protect the population, property and to enable the decisions leading to the elimination of accident consequences.

The logistic software will yield the information about:

- notification of organisations and bodies that are connected with the system of notification and activation of rescue teams,
- population warning in connection with the alarm systems,
- the measures planned to be taken within the framework of internal and external emergency plans of the nuclear power plant and the territory,
- organisational assurance of the preparation, operation and activity termination of the operating teams,
- measures and actions taken, specified in connection with time, space, personnel and communication modes,
- information acquisition, processing and distribution concerning the meteorological situation, air and water contamination, water level in rivers and other environmental data.

A part of activities in connection with SW will involve also the preparation of procedures and mechanisms within the ERC itself. These will determine the principles

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and procedures to be observed by the ERC personnel in order to reduce the probability of errors and meaningless improvisation under the stress situations.

Hardware

The ERC hardware will consist of combination of servers and workstations operated under the UNIX system and the personal computers of Pentium class operating under the NT Windows and Novell operation system.

The hardware used in ERC should be powerful enough to be able to store the processed data and to provide the printing services including the coloured printing facilities (namely the printing of the maps).

The hardware used will also assure the data communication with other participants and for this reason it will be selected accordingly.

Telecommunication Means

Because of its importance and significance in the case of nuclear emergency, the ERC must be equipped with reliable telecommunication means enabling not only the standard verbal and fax communication among all the participants of the emergency preparedness network but also with those who are not commonly accessible.

The following means of communication are considered:

- selected lines for fax transmissions and verbal communication
- solid data circuits (metallic, optical, RRS, SAT)
- line selected exclusively for verbal communication with Czech Energy Works (EEZ)
- activation connection (establishing a solid connection within an agreed upon time)
- preferential connection (at the overload of telephone exchanges, this connection remains operative also for the external communication)
- standard lines (direct)
- standard lines (through the telephone exchange)
- special lines enabling the access to the networks of Ministry of Interior, Defence and Transport)

All the verbal means of telecommunication at the disposal of ERC should be equipped with a recording facility.

Audiovisual Equipment

The Emergency Response Centre will need the audiovisual equipment for presenting the results of its work to the members of GCNE and also for monitoring the activity of mass information media.

To present the results of ERC activities it will be necessary to equip the Centre by standard audiovisual tools such as e.g. an overhead projector which would enable the projection of computer displays.

For monitoring the public information about the course of accident and to follow the response of mass information media it will be necessary to equip the ERC by standard audiovisual technique (radio and television sets, tape recorder and video recorder).

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Documentation

The ERC will need extensive documentation for its activity. This will include predominantly:

- ERC operational documentation
- drawing documentation of NPP
- operational regulations of NPP
- internal and external emergency plans of NPP

Archival Storing of Data and Programs

An archive which will be used in ERC should enable the storage and reinstallation of ERC software as well as archival backup of important data files. This archive should be specially protected against theft and fire in order to prevent loss in case of burglary or fire in the ERC premises.