EMERGENCY PREPAREDNESS IN GERMANY: MANUALS FOR EMERGENCY EXERCISES

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ABSTRACT

In Germany, the emergency preparedness with respect to severe accidents (events beyond the design basis) is directed to prevent any impacts on the enviroment and, if that is no longer possible, to reduce these impacts. This involves, on the one hand, measures planned to be taken inside the nuclear power plant (on-site accident management) and, on the other hand, measures planned to be taken outside of the plant (off-site disaster control).

Severe accident management scenarios (such as bleed and feed operation) and emergeny organizations have been established in nuclear power plants over the last decade in order to reduce the environmental impacts of the accidents. Severe accident management measures can only be performed effectively if the participating personel and parties are properly qualified and prepared for this task. Therefore, corresponding training exercises are of particular importance. Because of the "beyond-design-basis" character of these accidents, there are no detailed regulations and guidelines for the development of emergency preparedness in Germany. However, it has become common practice to perform at least one emergency exercise per year in every German nuclear plant.

The extent of these training exercises range from simple alarm drills, up to commanded post exercises, based on complex scenarios involving the authorities and the plant manufacturer. BfS has launched a project for the development of a manual for planning, co-ordination, and assessment of on-site accident management exercises. The objective is to establish an approach with a sound technical basis harmonized on federal level. An important part of this project was to develop methods for systematic preparation, performance evaluation of emergeny exercises. Volume 1 provides optimized exercises based on conventional event sheets, Volume 2 comprises the application of full-scope plant specific simulators. The current status of the manual is provided and proposals for a harmonized application are given.

Key words: emergency preparedness, national disaster control, emergency exercises

DETERMINATION OF RADIOACTIVITY IN THE AIR USING RAPID METHODS IN THE FIELD

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SUMMARY

Within the Institute for Medical Research and Occupational Health (IMI) in Zagreb operates a mobile unit equiped for the field intervention measurements in cases of possible radiological or nuclear accidents. The unit was established for the purpose of emergency preparedness when nuclear power plant Krško started to operate. Regular exercises are carried out twice a year at the selected locations of northwestern Croatia, in order to maintain the high professional level of emergency preparedness. The unit employs the methods of rapid field radioactivity measurements. These involve the measurements of exposure dose rates – digital dosemeter «ALARA OD», total α and total β activities in the air and in situ gammaspectrometrical measurements. It should be noted that theese techniques are sensitive enough to detect the presence of and even slightes increases of fission radionuclides.

Results represent the valuable basis on the status of radioactive contamination in the territory of northwestern Croatia. The paper presents only exposure dose rate data and total α and total β activities determined in the air of selected locations over the past few years, obtained in the field measurements during the exercises. According to our results, the total α activities ranged from 0.62 ± 0.7 Bqm^{-3} to 26.9 ± 0.3 Bqm^{-3} and total β activities from 1.6 ± 0.1 Bqm^{-3} to 412 ± 4 Bqm^{-3}. Rapid field methods are presently used for measurements of radionuclides in the atmosphere; they might be of terrestrial or cosmogenic origin. Radionuclides of the terreastrial origin include a multitude of short-life doughters of natural radioactive series. Their activity may enhance the total α and β activities in the air due to atmospheric circumstances (fog, fallout etc.). During laboratory measurements using standard procedure, daily α and β activities are detemined after a period of 120 hours from the end of sampling, which is the time necessary for the decay of short-life radionuclides. The enhanced presence of short-life radionuclides results from the momentary status of the atmosphere during the air sampling and directly depends on meteorological situation.

USE OF UNCOLLIMATED GAMMA CAMERA FOR EMERGENCY WHOLE-BODY COUNTING

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Abstract

Internal contamination is one of the most important issues in general scenario of nuclear accident. The assessment of body burden and risk from internally deposited radionuclides usually relies on systems for in-vivo measurement of radioactivity (whole-body counters). Since the throughput of a whole-body counter may be the limiting factor, all available measuring systems (such as those in nuclear medicine departments) are to be at disposal when larger number of individuals are contaminated.
The BOMAB phantom homogeneously filled with radioactive source of Ba-133, Cs-137 and Co-60 was measured by four different counting systems: Canberra Accuscan whole-body counter with one NaI(Tl) detector, and uncollimated Siemens DIACAM, Siemens ROTA and Marconi IRIX single, double and triple NaI(Tl) detector gamma cameras, respectively. During all measurements the distance between anterior detector and bed surface was the same, the acquisition geometry was horizontal scanning bed and the scan length was maximal.
The results of intercomparison are given for the main photopeak of Ba-133 (356 keV, window width 15%), which is a long-lived substitute for I-131. In regard to the different detector sizes and environments, relative count rates of single anterior detectors of gamma cameras were about 0.5-3 times the count rate of a whole-body counter.
This work presents first results of the intercomparison of different imaging systems (gamma camera) used as a counting systems (whole-body counter). Emergency use of gamma camera without a collimator is possible and justified, especially in case of wider-scale accidents with known contaminants, preferably emitting low- and mid-energy gamma radiation. However, great attention should be paid on calibration methodology, in order to substantially improve overall level of emergency preparedness.

Key words

emergency preparedness, internal contamination, whole-body counting

MAIN ASPECTS OF THE RODOS SYSTEM IMPLEMENTATION IN CROATIA

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Abstract

Analyses made in Europe after the accident in Chernobyl Nuclear Power Plant have shown that the key-element with the biggest impact on the development of consequences during and immediately after the accident was deficient notifying which was also unsystematic and in disorder. Therefore, scientific and expert organisations of the European Union have been faced with the task of system development above all meant to improve communication between European countries in terms of measured parameters exchange (the radiological and meteorological ones), that would be generally applicable in all the European countries. Development of such a system going by the name of RODOS (***R****eal Time* ***O****n Line* ***D****ecisi****O****n* ***S****upport*) began in 1989 within the framework of the European Commission's research and technological development program.
The main aspects associated with the implementation of the RODOS system in Croatia are described within this article. By the main aspects of implementation we mean technical prerequisites that the Republic of Croatia is due to fulfil before joining in, and they include activities like: (1) translating users' interfaces into Croatian, (2) adapting various models in consistence with local parameters, (3) collecting geographical data, (4) making specific local maps and collecting statistical data (GIS), and (5) linking the RODOS *real-time* data base with the net of local measure stations (radiological and meteorological). Activities of this scale and technically so demanding, request certain organisational prerequisites as well as considerable material resources. From the point of view of the Republic of Croatia, establishment of the RODOS system and inclusion into the *real-time* international exchange of measured radiological data would mean major improvement of the nuclear emergency response preparedness system.

Key words

RODOS, emergency planning, nuclear accident, implementation, technical support centre

SOFTWARE PACKAGE FOR THE TECHNICAL SUPPORT CENTRE

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The continued radiological surveillance system has been technically improved during the last two years by establishing 11 new automatic stations, so that there are currently 14 locations with installed **γ**-monitors for air radiation monitoring on the Croatian national territory. Given that the original system had been designed primarily for gathering data for off-line treatment with the purpose of statistical analyses, the contemporary Radiological Early Warning System (SPRU) approach has demanded developing of a new software by the Technical Support Centre (TPC) in order to allow operators interactive work in the case of emergency situations. The outcome of this development is a software package called DORAP (Automatic Radiological Station Remote Reading), which brings together automatic functions of continual data gathering, daily production of the standard report, distribution of the report by fax, SMS (**S**hort **M**essage **S**ervice), SMT (**S**imple **M**ail **T**ransfer) and FTP (**F**ile **T**ransfer **P**rotocol) as well as generation and distribution of alarms in the case of failure in the system or exceeding of the set radiation intensity values.

Key words
Early Warning System, DORAP, emergency planning, nuclear accident, technical support centre