



Application of the Bulgarian emergency response system in case of nuclear accident in environmental assessment study

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The development of the Bulgarian Emergency Response System (BERS) for short term forecast in case of accidental radioactive releases to the atmosphere has been started in the mid 1990's [1]. BERS comprises of two main parts - operational and accidental, for two regions "Europe" and "Northern Hemisphere". The operational part runs automatically since 2001 using the 72 hours meteorological forecast from DWD Global model, resolution in space of 1.5° and in time - 12 hours. For specified Nuclear power plants (NPPs), 3 days trajectories are calculated and presented on NIMH's specialized Web-site (<http://info.meteo.bg/ews/>). The accidental part is applied when radioactive releases are reported or in case of emergency exercises. BERS is based on numerical weather forecast information and long-range dispersion model accounting for the transport, dispersion, and radioactive transformations of pollutants. The core of the accidental part of the system is the Eulerian 3D dispersion model EMAP calculating concentration and deposition fields [2]. The system is upgraded with a "dose calculation module" for estimation of the prognostic dose fields of 31 important radioactive gaseous and aerosol pollutants. The prognostic doses significant for the early stage of a nuclear accident are calculated as follows: the effective doses from external irradiation (air submersion + ground shining); effective dose from inhalation; summarized effective dose and absorbed thyroid dose [3]. The output is given as 12, 24, 36, 48, 60 and 72 hours prognostic dose fields according the updated meteorology.

The BERS was upgraded to simulate the dispersion of nuclear materials from Fukushima NPP [4], and results were presented in NIMH web-site. In addition BERS took part in the respective ENSEMBLE exercises to model ^{131}I and ^{137}Cs in Fukushima source term.

In case of governmental request for expertise BERS was applied for environmental impact assessment of hypothetical accidental transboundary radioactive pollution. The consequences were estimated based on the worst emission scenario for the existing basic reactor type, selection of real meteorological forecast conditions, favoring the direct transport of the contaminated air masses to the territory of the country in consideration. In the present work BERS is used to estimate the worst case accidental scenario impact from a possible new unit of Paks Nuclear Power Plant, Hungary over the territory of Bulgaria.

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3. D. Syrakov, B. Veleva, M. Prodanova, T. Popova, M. Kolarova, *Journal of Environmental Radioactivity* 100 (2009) 151-156.
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