MODELING OF DOSE RATES IN CASE OF A RADIOLOGICAL INCIDENT AT THE IFIN-HH INTERMEDIARY GRAPHITE STORAGE

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Abstract. *The low and intermediate level activity wastes resulted from decommissioning of the VVR-S nuclear research reactor belonging to the "Horia Hulubei" National Institute for R&D in Physics and Nuclear Engineering (IFIN-HH), are kept in an intermediary storage facility. The storage is located on the premises of the Institute near Bucharest, Romania and includes activated graphite from the reactor thermal column. In case of a very low probability hypothetical atmospheric radiological dispersal incident such as an unexpected fire, despite all the implemented safety measures, there is a certain radiological risk for the workers and general public due to potential ingestion or inhalation or contact with the radioactive aerosols released on a certain range from the storage building. For estimating the total gamma dose intake and adequate countermeasures for workers and public members, the JRODOS (Real-time On-line Decision Support) code system for off-site emergency management after nuclear accidents was used in the paper.*

Keywords: Radiological incident; Atmospheric dispersal; Aerosol dose intake; Nuclear decommissioning; Radioactive waste, Graphite

1. Introduction

The VVR-S nuclear research reactor with thermal neutrons was located within the IFIN-HH premises. The reactor was operated from July 1957 to December 1997 with a power of 2 MW and a maximum neutron flow of $2x10^{13}$ n/cm^{2}s, producing 9.59 MWd of thermal energy. It used distilled water as a cooling agent and moderator as reflector. Initially, low-enriched nuclear fission fuel was used in isotope U-235 (10%) – type EK-10. Since 1984 it has been progressively replaced with nuclear fission fuel type S-36, highly enriched in isotope U-235 (36%). The installation has been used for research activities in the field of physics, biophysics, biochemistry and radiochemistry as well as for research and analysis on the composition of materials by irradiating them in the internal column with thermal high flux neutrons.

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