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Radiation safety analysis of the management of radioactive sources from lightning rods

The paper presents the radiation safety analyses of the management of radioactive sources coming from lightning rods. Such management of sealed sources is part of activities on their planned dismantling and decommissioning activities of old radioactive waste storages in Serbia where dismantled lightning rods are stored. Since these sources cause a large contribution to the radiation dose, the results of the analyses are of primary importance for identifying the potential radiation hazard in order to achieve minimization of operator exposure and the release of radionuclides into the environment. Available data on the production of lightning rods during the 1970s were used, as well as data from operational logs on the receipt of dismantled lightning rods. The methodology used for the analysis of the contribution of direct exposure to ionizing radiation from sources during the planned operations was verified through several experiments. This radiation safety analysis includes reference photon flux calculations based on Monte Carlo simulations and the use of conversion factors for equivalent and effective dose rates according to ICRP-74 and ICRP-116 standards. For the analyses, geometric models were developed for known packages with radioactive sources from the lightning rods for different situations related to the location of sources.

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