

Abstract

Mgr. Alžbeta Brandýsová: *Research on population exposure from radon in areas with high soil radon potential* [Dissertation thesis].

Comenius University in Bratislava. Faculty of mathematics, physics and informatics, Department of nuclear physics and biophysics. Supervisor: doc. RNDr. Karol Holý, CSc., doc. RNDr. Monika Müllerová, PhD., Consultant: RNDr. Martin Bulko, PhD., Bratislava, 2024. 194 pgs.

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The primary interest in the radioactive isotope ^{222}Rn (radon) arises mainly from the existence of a potential health risk to humans from exposure to radon and its progeny. The identification of areas with elevated indoor concentrations of ^{222}Rn is an internationally recognised problem. Therefore, it is necessary to assess the radon potential of the soil to prevent the possible accumulation of ^{222}Rn in buildings, either prior to the construction of buildings in the area of interest, or through the application of remedial measures in existing buildings. For the territory of the Slovak Republic, no study of soil radon potential assessment has been performed yet. Therefore, in this thesis we deal with the determination of radon potential for selected, mainly inhabited areas using measured soil characteristics (radon activity concentration in soil air at a depth of 0.8 m; soil gas permeability). Special attention will be paid to the experimental verification of the predictions of areas with potentially elevated indoor ^{222}Rn concentrations, and to the subsequent determination of estimates of annual effective doses of ^{222}Rn to the population of the Slovak Republic.

An important part of the thesis also consists of testing approaches for the determination of radon exhalation rates from soil for the territory of the Slovak Republic based on various theoretical and empirical relationships. These relationships utilize measured concentrations of terrestrial radionuclides ^{226}Ra , ^{232}Th , ^{40}K and ^{222}Rn in soil in the context of the identification of areas with increased radiation risk due to exposure to ^{222}Rn . The constructed maps of radon exhalation rate for the territory of Slovakia can also be used for the refinement of soil radon risk assessment, as well as for other environmental applications.