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Experimental study on the characteristics of radon cover in waste landfills

Waste from resource extraction industries contain uranium and thorium decay chain radionuclides. One important radiological impact of these wastes is the release of radon into the atmosphere. Therefore, prediction/evaluation of radon flux and effectiveness of different covers are the major elements in radiation protection, long-term safety aspects, and to model radon release to the environment for final assessment of radiological impacts and required remediation actions [1,2]. The authors designed a measurement system by short-time accumulation technique based on transient-diffusion method and the validity of the laboratory model to quickly estimate the radon release from soils, diffusion coefficient, and the effect of covers was investigated [3]. It was observed that after 0.5 m and 1 m clay cover layer with diffusion coefficient (1.78⊠0.24)⊠10-6 m2 s-1, the measured radon flux density from bare waste, 1.05⊠0.23 Bq m-3, decreases by a factor of 1.7 and 2.8, respectively, to 0.61⊠0.12 Bq m-3 and 0.37⊠0.06 Bq m-3. Concerning to the measured radon diffusion length, the radon flux reduction factor increases to 10 for 1.6 m clay cover layer. The results show that the effectiveness of the studied cover layer is 3, which is similar to theoretical and experimental results in uranium tailings pond [4].

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