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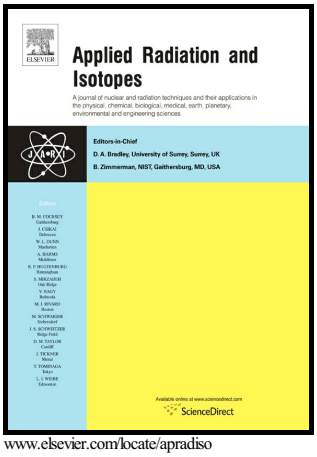

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Radon measurements and dose estimate of workers in a manganese ore mine

Amin Shahrokhi[1], Tamás Vigh[2,3], Csaba Németh[4], Anita Csordás[1], Tibor Kovács[1,3*]

[1]*Institute of Radiochemistry and Radioecology, University of Pannonia, 10 Egyetem str., H-8200, Veszprém, Hungary*

[2]*Manganese Mine Ltd. Úrkút, Hungary*

[3]*Social Organization for Radioecological Cleanliness*

[4]*Institute of Physics and Mechatronics, University of Pannonia, POB 158, 8201 Veszprém, Hungary*

[*]Corresponding author: Tibor Kovács, PhD; Institute of Radiochemistry and Radioecology, University of Pannonia, P.O. Box 158, H-8201 Veszprém, Hungary. kt@almos.uni-pannon.hu

Abstract

In the new European Basic Safety Standard (EU-BSS), a new reference level for indoor radon concentration in workplaces has recommended that the annual average activity concentration of indoor radon shall not be higher than 300 Bq m^{-3}. This paper describes the radon concentration level in an underground workplace (manganese ore mine) over long time intervals (4 years). Several common radon monitors devices – including NRPB and Raduet (as a passive method based on CR-39), AlphaGUARD PQ 2000Pro, SARAD EQF3220, TESLA and Pylon WLX (as active methods) – were used for continuous radon measurements. The output results were used, first, to comprised the result of each device, based on conditions present in underground mines; Second, to have comprehensive measurements about all factors that cause workers exposure to radiation (each monitoring device specified for a unique measurement). The results indicate that the mine's staff had successful efforts to reach the strict requirement of the new EU-BSS, and the average annual radon activity concentrations during the working hours were below 300 Bq m^{-3} in the investigated period. The paper presents the effective dose calculations; applying different equilibrium factors suggested by the literature and calculated basing on our measurements at the site, concluding that the differences could be about threefold.