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VIRTUAL EVENT

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ENVIRONMENTAL IMPACT ASSESSMENT OF NATURALLY OCCURRING RADIOACTIVE MATERIALS IN UNDERGROUND GOLDMINES IN GHANA

Measurements of indoor radon concentrations and environmental factors were collected monthly over a period of one year in 10 different levels in an underground goldmine to determine the radiological impact on workers. The detectors were installed in batches within four quarters. The activity concentration within the year ranges from a minimum of 2 Bqm-3 to a maximum of 284Bqm-3 with a mean value of 58.51Bqm-3. A positive relationship was observed between dry bulb temperature, relative humidity and radon concentration while a negative relationship was observed between barometric pressure, air quantity, wet bulb temperature, wet kata temperature and radon concentration but all the relationship was statistically insignificant but a principal component analysis deduced three main factors that influences the indoor radon concentration of which the wet kata temperature was statistically significant and the 5% level of significance. Measurements of soil and rock samples were collected monthly over a period of one year in 10 different levels in an underground goldmine to determine the radiological impact on workers. The samples were analysed using a high pure germanium detector. The average permissible value for Ra-226 and K-40 were below the permissible value unless Ra-226 that was higher than the permissible value. The highest concentration of the natural radionuclides in soil and rock samples was observed in level 880 and the lowest concentration was observed in 1000YOD. The hazard indices, exposure rate, excess lung cancer risk and annual effective dose from the rock and soil samples possess no radiological hazard if used for construction of buildings.

Keywords

Radon Concentration, NORM, Underground goldmine, Environmental factors

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