

Title: Radiation dose assessment: Establishment of local diagnostic reference levels for selected radiography examinations across three prominent hospitals in Sudan

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Abstract: This research assesses radioactivity in soil and coal samples around the Barapukuria coal-fired thermal power plant using a high-purity germanium detector. The range of activity of ^{226}Ra , ^{232}Th , and ^{40}K in the studied soil samples were 14–75, 16–112, and 132–460 Bqkg⁻¹, respectively and the respective activity in coal samples ranged from 14–30, 16–39 and 72–182 Bqkg⁻¹. The majority of the hazard indices (absorbed dose rate, gamma index, effective dose and excess lifetime cancer risk) were higher than the world average, which shows that long-term exposure to terrestrial ionising radiation is not safe for coal miners and the local community. The presence of minerals like monazite and zircon, granitic type parent rock, bottom ash discharged adjacent on lowlands, fly ash deposition, different geochemical and physicochemical properties, dominant wind directions, the artificial contamination, meteorological conditions, leaching caused by rainwater- may have a crucial influence on NORM distributions. The quantitative results of this study have important implications for planning a larger and more modern coal-fired power plant, and this study's findings inspire municipal officials to restrict and monitor the release of fly ash nearby coal-fired power plants. In addition, it is essential to monitor the health of individuals (workers and locals) near the power plant.

Key words: Coal-fired power plant, natural radio activity soil HPG hazard parameters

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