

ABSTRACT

Present study is carried out in and around a uranium mineralized zone, which is in the central part of the Singhbhum Shear Zone. The present study is focused mainly on two aspects: first part is concerned to the spatial distribution of environmental radiation in the study area while second part is related to the geological control of the radon exhalation. First objective covers spatial distribution of terrestrial radiation and technologically enhanced radiation that is the study on the environmental contamination due to radioactive waste and added chemicals from a tailings pile near a uranium processing facility in the study area. Spatial distribution of natural radionuclides also contains the ambient study of the ambient gamma radiation from the local virgin rocks and soils.

The spatial variation in radioelemental concentration has reflected the geochemical variation among the analyzed rocks that affirms the earlier views on the genesis of U mineralization and also speculated on new possibilities of Th-depletion during shearing and metamorphism. All the obtained U-values are more than the world wide average U-activity concentration. Contribution of ^{232}Th activity to the total radiation dose was found to be significant when compared with the contribution of ^{238}U in the area under study. A good concordance of porosity on radon flux was observed. It is concluded that it may not be advisable to utilize materials that are uranium depleted for construction purposes without giving importance to the materials' porosity. Interpretations of the resistivity data, very low frequency electromagnetic data and radiometric data suggest no groundwater movement in dipper depth and the tailings storage facility at Jaduguda is reasonably safe from any possible contamination.

Keywords: *Environmental radioactivity, Radon flux, Geological control, porosity, Tailings pond, Electro-magnetic surveys, Hydrogeological contamination.*