Contribution ID: **203** Type: **Poster Presentation**

Ambient gamma dose rate measurements at Manyoni uranium mines, Singida, Tanzania

Wednesday, 1 July 2015 16:10 (1h 50m)

Abstract content
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Recent uranium exploration studies in Tanzania have found several economically viable uranium deposit sites. This has brought concern to the public in nearby villages on the radiological health hazard, which may be associated with uranium mining. At Manyoni, pre-mining baseline data of the ambient gamma radiation dose rates are carried out, which serves as a reference information during and after uranium mining. Dose rate measurements on contact (at the surface) and in air (one meter from the ground) are taken using a survey meter from the expected mining zones and eleven villages surrounding Manyoni and in Manyoni town locating the sampling coordinates by the global positioning system (GPS).

High levels of natural radiation are measured at the proposed Manyoni uranium mines. The absorbed gamma dose rates at the surface and in air due to the naturally occurring radionuclides varied from 131 to 1678 nGy h⁻¹ (98 to 1657 nGy h⁻¹) with the mean value of 904 nGy h⁻¹ (877 nGy h⁻¹). The maximum value measured is about thirty times the world average of 59 nGy h⁻¹ [1]. The annual effective dose rates for the region range from 0.16 to 2.06 mSv yr⁻¹ (0.12 to 2.03 mSv yr⁻¹). The main conclusions are: high gamma radiation background at Mwanzi, Kinangali and Kinyika-Mbwekoo villages; and there is a need for conducting effective dose equivalents and health risk assessment for general public near the proposed uranium mining site. We report preliminary findings of our results and discuss them.

[1] UNSCEAR, Sources and effects of ionizing radiation, United Nations Scientific Committee on the Effect of Atomic Radiation, United Nations, New York, 2000.

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Session Classification: Poster2

Track Classification: Track B - Nuclear, Particle and Radiation Physics