



Contribution ID: 112

Type: Oral Presentation

DETERMINATION OF THE NATURAL RADIONUCLIDE CONTENT AND ASSOCIATED RADIATION HAZARDS IN SOIL SAMPLES COLLECTED FROM THE OHORONGO CEMENT PLANT NEAR OTAVI, NAMIBIA

Friday 29 June 2018 17:40 (15 minutes)

The concentrations of naturally occurring radionuclides ^{238}U , ^{232}Th , and ^{40}K in the soil samples collected from the Ohorongo Cement Plant near Otavi, Namibia have been determined and used to estimate the baseline natural radiation level in the cement plant. A total of 50 soil samples were collected from inside and outside of the plant and analyzed using an HPGe detector. The concentrations vary from 7.3 ± 1.2 to 25.6 ± 1.8 Bq/kg with an average of 15.0 ± 4.7 Bq/kg for ^{238}U , 12.7 ± 2.0 to 43.1 ± 3.5 Bq/kg with an average of 25.1 ± 9.9 Bq/kg for ^{232}Th , and 132.2 ± 9.7 to 507.8 ± 22.5 Bq/kg with an average of 310.7 ± 97.2 Bq/kg for ^{40}K . These concentrations were used to calculate the mean absorbed dose rate and the mean annual effective dose for the plant. The value of 0.04 mSv obtained for the mean annual effective dose is less than the maximum permissible dose of 1 mSv a year recommended for the public by the International Commission on Radiological protection. In order to evaluate the associated health hazard, the concentrations were also used to calculate the mean Radium equivalent activity (Req) and the mean external hazard index (Hex) for the plant. The values of 74.9 Bq/kg and 0.20 obtained respectively for Req and Hex are again much below their respective permissible values. These results and the low value obtained for the mean annual effective dose indicate that radiation hazard is negligible in the plant.

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Session Classification: General