



Natural Radioactivity at the Sin Quyen Iron-Oxide-Copper-Gold Deposit in North Vietnam

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Abstract

The field radiometric and laboratory measurements were performed at the Sin Quyen copper deposit in North Vietnam. The field gamma-ray spectrometry indicated the concentration of uranium ranging from 5.5 to 87 ppm, thorium from 5.6 to 33.2 ppm, and potassium from 0.3 to 4.7%. The measured dose rates ranged from 115 to 582 nGy/h, the highest doses being at the copper ore. Concentrations in the solid samples were in the range of 20-1700 Bq/kg for uranium, 20-92.7 Bq/kg for thorium, and 7-1345 Bq/kg for potassium. The calculated doses were from 22 to 896 nGy/h; both measured and calculated dose rates are mostly related to uranium. Concentrations of radium in water samples were below 0.17 Bq/L. Uranium in water samples was significantly higher than the hydrogeological background; the maximum of 13 Bq/L was at the waste zone pool, but neither radium nor uranium were present in tap water. Radon concentration in the dwelling air was from 42 to 278 Bq/m³ for ²²²Rn and from 8 to 193 Bq/m³ for ²²⁰Rn. The estimated committed dose rates

were principally related to ^{222}Rn concentration and ranged from 1.1 to 8.1 mSv/y.

Key words: IOCG deposit, natural radionuclides, dose rate.