Natural Radioactivity and Environmental Impact Assessment at Dong Pao Rare Earth Mine, Lai Chau, Vietnam

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Abstract

Dong Pao rare earth mine containing radioactive uranium and thorium in Ban Giang and Ban Hon communes, Tam Duong district, Lai Chau province, with an area of about 12.4 km^2 and total reserves of 11.8 million tons concentrate of rare earth ores, is a mine with large reserves of rare earth metal resources of Vietnam being explored to be put into exploitation in the near future. The activity of natural radionuclides and radiation dose are important parameters in assessing the effect of radioactivity on the environment when the mines go into operation. Investigation soil, water, air, plants and annual radiation dose levels in the region in order to contribute to the management and supervision of the radioactive environment in rare earth mining. The results showed that the radioactive activity of soil and plants increased higher than the permitted standard; The annual radiation dose value results are 15.6 $mSvyear^{-1}$, 6.5 times higher than the world average (2.4 $mSvyear^{-1}$).

The results of the health survey of people living in and outside the mines showed that there was a difference between the abnormal rate of blood counts between inside and outside the radioactive area. The rate of erythrocyte abnormalities (related to anemia) of people outside radioactive anomalies is much lower than that of people living in radioactive anomalies (HST: low rate of 14.3% compared with 36.4 ÷ 38.4%; MCH: 68.5% lower than 24% compared to 93.4 ÷ 96.3%; MCHC: 5.4% lower than 88.5%

compared to 93.6 ÷ 97.3%; RED rate is 7.4% lower than 56.4% compared to 68 ÷ 72%). These are evidences on the impact of radiation on the health of workers living and working in mines producing high levels of radioactive material.

Keywords

Radioactive nuclides Health Environment Rare earth mine Dong pao Annual effective dose

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