



RADIOLOGICAL RISK ASSESSMENT OF ABANDONED TIN MINES IN PHUKET AND SONGKHLA PROVINCES

Saroh Niyomdecha¹, Wipada Ngansom², Dumrongsak Rodphothong², Monthon Yongprawat³, Phontipha Tungtrakoon¹, Yutthana Tumnoi¹ and Thawatchai Itthipoonthanakorn.^{1*}

¹Regulatory Technical Support Division, Office of Atoms for Peace, Thailand

²Department of Physics, Faculty of Science, Ramkhamhaeng University, Bangkok, 10240, Thailand

³Nuclear Technology Research and Development Center (NTRDC), Thailand Institute of Nuclear Technology (TINT), Nakhon Nayok, 26120, Thailand

*Corresponding author: thawatchai.i@oap.go.th

Abstract:

Naturally occurring radioactive materials (NORMs) is well understood that could be contaminated in abandoned mines. However, in southern part of Thailand abandoned mines are used as reservoirs for tap water production, tourist attractions and recreational areas which possibly risk on public health of long-term exposure of radiation. This research aims to study the naturally occurring radioactive materials (NORMs) possibly accumulated in abandoned tin mines in Phuket and Songkhla provinces. Environmental samples (surface soil and water) of 7 and 1 abandoned tin mines in Phuket and Songkhla respectively have been collected. All samples were packed in sealed plastic containers then left for 3 weeks until reaching a secular equilibrium. Samples were counted for 80,000 seconds and analyzed for radioactivity of natural radionuclides using gamma spectrometry (HP-Ge detector). Finally, radiation dose of public has been assessed. The results suggest that activity concentration of natural radionuclides in studied abandoned tin mines are very low. Activity concentration of Ra-226, Ra-228 and K-40 in surface soil of those abandoned mines are range of $33\pm 2-313\pm 14$, $67\pm 6-398\pm 20$ and $108\pm 11-1295\pm 70$ Bq/kg respectively, while in water samples are lower than Minimum Detectable Concentration (MDC of Ra-226, Ra-228 K-40 are approximately 0.1-0.2, 0.2-0.4 and 0.3-0.9 Bq/kg respectively). They are also suggested that people living in those areas 24 hours received radiation dose of those natural radionuclides less than approximately 0.1-0.5 mSv/y which concluded that no possible risk of radiation on public health for living in area of those abandoned tin mines.