Watech-2013
International Exhibition and Conference on
Water Technologies, Environmental Technologies & Renewable Energy
February 13-14, 2013 Bombay Exhibition Centre, Mumbai, India

Box model for estimation of radionuclide dispersion in seawater and radiation risks for coast population caused by NS #601 drowned in Kara Sea

Vladimir Iarovitcin

Institute for Physics and Power Engineering, Russia

Abstract

A relatively simple analytical model is considered for estimation of dispersion of radio nuclides in the seawater and radiation risks for coast inhabitants in case of release of accumulated radioactivity from the Nuclear Submarine (NS) #601 with two lead-bismuth cooled reactors on the board, which has been drowned in the Kara Sea in 1981. The nuclide composition of accumulated radioactive materials was specified. Radionuclide concentration in the seawater, additional radiation dose rates and risks for population were calculated for two scenarios of radioactivity release from the NS. For the first scenario with fast release of the total activity (for instance, in case of local earthquakes or military activities), it is shown that an individual dose of additional exposure is ~ 2 μSv per year, i.e. ~ 0.1% of the natural background. Radiation risk in this case is ~10^{-7} per year with background risk ~10^{-5} per year. For the second scenario with the total activity release during ~50 years (due to slow nuclear core destruction by corrosion), these values are lower by three orders of magnitude.

Biography

Vladimir Iarovitcin has graduated from Ivanovo Power Engineering University at the age of 22 years and worked during 30 years as engineer and researcher in the area of fast reactors. He is the Leading Officer of the International Cooperation Department of the Institute for Physics and Power Engineering in Obninsk. He is coauthor of more than 40 reports and papers including those presented at the international conferences.