

Risk Assessment of Radiation Hazard for a Typical WWER1000: Cancer Risk Analysis during a Hypothetical Accident

Authors : R. Gharari, N. Kojouri, R. Hosseini Aghdam, E. Alibeigi, B. Salmasian

Abstract : In this research, the WWER1000/V446 (a PWR Russian type reactor) is chosen as the case study. It is assumed that radioactive materials that release into the environment are more than allowable limit due to a complete failure of the ventilation system (reactor stack). In the following, the HOTSPOT and the RASCAL computational codes have been used and coupled with a developed program using MATLAB software to evaluate Total effective dose equivalent (TEDE) and cancer risk according to the BEIR equations for various human organs. In addition, effects of the containment spray system and climate conditions on the TEDE have been investigated. According to the obtained results, there is an inverse correlation between the received dose and the wind speed; the amount of the TEDE for wind speed 2 m/s and is more than wind speed for 14 m/s during the class A of the climate (2.168 and 0.444 mSv, respectively). Also, containment spray system can effect and reduce the amount of the fission products and TEDE. Furthermore, the probability of the cancer risk for women is more than men, and for children is more than adults. In addition, a specific emergency zonal planning is proposed. Results are promising in which the site selection of the WWER1000/V446 were considered safe for the public in this situation.

Keywords : TEDE, total effective dose equivalent, RASCAL and HOTSPOT codes, BEIR equations, cancer risk

Conference Title : ICNEET 2018 : International Conference on Nuclear Energy Engineering and Technology

Conference Location : Prague, Czechia

Conference Dates : July 09-10, 2018