

Atmospheric Dispersion Modeling for a Hypothetical Accidental Release from the 3 MW TRIGA Research Reactor of Bangladesh

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Abstract : Atmospheric dispersion modeling is significant for any nuclear facilities in the country to predict the impact of radiological doses on environment as well as human health. That is why to ensure safety of workers and population at plant site; Atmospheric dispersion modeling and radiation dose calculations were carried out for a hypothetical accidental release of airborne radionuclide from the 3 MW TRIGA research reactor of Savar, Bangladesh. It is designed with reactor core which consists of 100 fuel elements (1.82245 cm in diameter and 38.1 cm in length), arranged in an annular core for steady-state and square wave power level of 3 MW (thermal) and for pulsing with maximum power level of 860 MWth. The fuel is in the form of a uniform mixture of 20% uranium and 80% zirconium hydride. Total effective doses (TEDs) to the public at various downwind distances were evaluated with a health physics computer code "HotSpot" developed by Lawrence Livermore National Laboratory, USA. The doses were estimated at different Pasquill stability classes (categories A-F) with site-specific averaged meteorological conditions. The meteorological data, such as, average wind speed, frequency distribution of wind direction, etc. have also been analyzed based on the data collected near the reactor site. The results of effective doses obtained remain within the recommended maximum effective dose.

Keywords : accidental release, dispersion modeling, total effective dose, TRIGA

Conference Title : ICNAMTA 2020 : International Conference on Nuclear Accident Monitoring Technology and Applications

Conference Location : Singapore, Singapore

Conference Dates : January 09-10, 2020