P09

Langragian And Eulerian Approach To Predict Movement Of Radionuclides In Selected Potential Sites In Malaysia During Monsoon Period.

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In computing the movement of particle through the fluid, there are three types of dispersion models that are used which are gaussian plume models, Lagrangian puff models and small-scale numerical models. Lagrangian particle dispersion models are increasingly used for nuclear applications. In this study, the usage of the Lagrangian model is implemented in HYSPLIT (Hybrid Single Particle Lagrangian Integrated Trajectory) which combine with the Eulerian model to predict movement of radionuclides from the simulated nuclear power plant accident in selected locations in Malaysia. These include nuclear risk studies at these area, emergency response systems, and source term analyses. The aim of this study is to compare the risk from the dispersion of ^{137}Cs from simulated NPP at Mersing, Mukah, Tasik Temenggor, Tasik Kenyir and Mengkuang Dam during Northeast monsoon and Southeast monsoon. The HYSPLIT model was setup based on the meteorological data during both monsoon period and be simulated for 5 days after the accident occur. On the first day after the simulation, the outcomes revealed that the ground deposition of ^{137}Cs is highest at at Mengkuang Dam (1×10^8 kBq/m^2) during Northeast monsoon and at Tasik Kenyir (8×10^7 kBq/m^2) during Southeast Monsoon. Meanwhile, for the lowest value of ground deposition of the same radionuclide during the first day of the accident is at Mersing (4.3×10^6 kBq/m^2) during Northeast monsoon and at Mukah (8.3×10^6 kBq/m^2) . After 5 days of the accident, it shows that the lowest ground deposition of ^{137}Cs is at Mukah (12 kBq/m^2) during Northeast monsoon and at Tasik Kenyir (100 kBq/m^2) during Southeast Monsoon. By the average movement of the radionuclides during 5 days after the nuclear incident, this study conclude that Mukah compute lowest risk among the dispersion of radionuclide as the activity of the radionuclide from the selected NPP is at lowest value for both northeast and southwest monsoon period. This study also aims to provide an evacuation path for each location as an emergency preparedness if the accident based on the graphical dispersion of the radionuclides during the 5 days after the Nuclear Power Plant accident occur.

Keyword: Hysplit; Langragian; Nuclear sitting; Atmospheric dispersion