

ABSTRACT

Nacar, Muriel Nina R. M.S.E., Purdue University, December 2012. Comparing Atmospheric Dispersion Models. Major Professor: Dr. Robert B. Jacko.

In light of the most recent Fukushima nuclear meltdown in Japan, the idea of using more nuclear power appears to be more unlikely than ever. Despite this, the use of nuclear power, if used with the most precautions, still serves to be a good additional energy source. The United States Nuclear Regulatory Commission requires atmospheric dispersion models be used to simulate potential accidental situations at a nuclear power plant before the permitting of a nuclear reactor is expedited (NUREG/CR-2260). Three models were chosen according to their characteristics for a comparison to figure out which would be best to use for those given scenarios. These models were HotSpot, a health physics computer code developed by the Lawrence Livermore National Laboratory; AERMOD, a model developed by the Environmental Protection Agency; and CALPUFF, a model developed by the Atmospheric Studies Group at TRC Companies, Inc. Each model is accessible to download for free online. Using the same input, such as similar stability classes, and rural and urban settings, and set-up for parameters of one single nuclear reactor of the same height, many conclusions were made regarding the concentrations that were calculated with each model.