# A COMPUTER MODEL ON CONSEQUENCES OF SUDDEN RELEASE OF RADIOACTIVITY INTO THE ENVIRONMENT

M. Chandrasekhar, Hemant Kumar, P. Ramaseshu,
M.M. Gupta and A.R. Reddy
Defence Laboratory Jodhpur 342001, India

## ABSTRACT

Events like Chernobyl and Three Mile Island have demonstrated the vulnerability of reactors to accidents and human errors in spite of elaborate safety measures. Radioactive plume from such accidents can propagate over large distances. This calls for a quick assessment of the situation for emergency planning. Keeping this in mind a software has been developed on a personnel computer (an IBM PC compatible) with 256 K memory. This predicts the exposure level due to accidental release of radioactivity in the atmosphere. Gaussian dispersion has been assumed for both horizontal and vertical propagation. This is a modified version of WASH-1400 (Ref: USNRC(1975) Reactor Safety Study - an assessment of accident risks in US commercial nuclear power plants NUREG-75/014). Input release characteristics include magnitude, duration, isotopic concentration, probability and height of release. Meteorological factors like wind speed and atmospheric stability have been incorporated in a time variant mode. This software has the added advantage of the presentation in color graphics enabling quick visual judgement.

This was employed to evaluate the dose levels around Chernobyl. The meteorological data were deduced from the published accounts. A half an hour release of 8 MCi, excluding noble gases, on the first day at a height of 1200 m was assumed with I-131 as the dominant component. For noble gases a 100% release was assumed (Ref: IAEA Safety Series No. 75-INSAG-1, 1986). The external exposures are estimated to be 140 mR/hr each for the population around 4 km distance. This compares reasonably well with the data published in IAEA report.