

## Analysis of Sodium Expansion Work Energy during Core Disruptive Accidents in KALIMER

Soo-Dong Suk, Yong-Bum Lee, and Dohee Hahn

Korea Atomic Energy Research Institute

150 Dukjin-dong, Yusong-gu, Daejeon, Korea 305-353

### Abstract

An effort was made in this study to evaluate work energy arising from two-phase expansion of sodium during core disruptive accidents in KALIMER. Work potentials were calculated for sodium expansion using the simple thermodynamic models including the infinite heat transfer model during expansion (Hicks and Menzies method) and more realistic zero heat transfer model for a typical initial condition of core disruptive accident. Sodium expansion analysis was also carried out using the SOCOOL-II code, in which the rate of heat transfer is calculated by conduction in the fuel and sodium and geometrical constraints are considered to determine the time available for heat transfer. Scoping calculations with a modified Bethe-Tait method were carried out to have available the initial thermodynamic conditions for these analyses. It was shown that resulting values of the work potential for the design basis case of power excursion were a bit higher than but close to the structural design criteria for the reactor system of KALIMER.