

RFA-17-14639, Dynamic Natural Convection for Passive Decay Heat Removal

DYNAC specializes in enhanced reactor safety for current light water reactors (LWRs) and developed the dynamic form of natural convection (DNC) for passive heat removal. Systems based on DNC lower the core damage frequency of LWRs by about one order of magnitude due to simplicity, passive design, independence from electric power and controls. Owing to these characteristics, the cost of DNC systems is much lower than that of active safety systems required by the Nuclear Regulatory Commission following the Fukushima accidents. The Fukushima and Three-Mile Island accidents would have been prevented by DNC systems. DNC systems lower the maintenance requirements for the active safety systems in current reactors, resulting in additional savings and alleviating the workforce challenge for nuclear utilities. The concept constitutes a major simplification of LWR technology and LWR operating procedures.

In order to provide preliminary results for the transient response of a LWR plant with DNC decay heat removal systems, DYNAC has requested that Idaho National Laboratory perform a RELAP5-3D analysis of a current-generation nuclear power plant with DNC system following a station blackout.