

Aggressive Cooldown Analyses for Small Break LOCA
with a Failure of SIS

Seok Jeong Park, Sung Goo Chi, Chul Jin Choi, and Jong Tae Seo
Korea Power Engineering Company, Inc
150 Duckjin-dong, Yusung-Ku, Daejeon KOREA, 305-353

Abstract

Thermal hydraulic analyses were performed to support the development of risk-informed design methodology using best estimate computer model, input data and assumptions. In the case of small break LOCA with a failure of the safety injection system, aggressive secondary cooldown (ASC) analyses were performed to demonstrate that ASC could be accomplished with advanced conceptual designs. In addition, the rapid depressurization analyses using the safety depressurization system were performed to depressurize the primary pressure below shutdown cooling pump shut-off head.

The RELAP5/MOD3 code was used to perform the small break LOCA analyses and KNGR/System 80+ database as the basic input. It was verified that aggressive secondary cooldown could be accomplished with one SIT using 100 °F/hr cooldown rate at 15 minutes without exceeding the safety limit. For the rapid depressurization using SDS valve, it was demonstrated that the rapid depressurization could be successfully accomplished with one SDS valve opening at 30 minutes without the use of SIT.