Proceedings of the Korean Society Spring Meeting
Pohang, Korea, May 1999

A Study on the Behavior of Debris around a Sump of a Safety Cooling System

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Abstract

The Regulatory Guide 1.82 recommends an analysis of hydraulic performance of safety cooling System sump when LOCA(Loss of Coolant Accident) occurs in a nuclear power plant. The present study deals with 3-dimensional, unsteady, turbulent and two phase flow simulation to examine the behavior of mixture of reactor coolant and debris in the floor of containment building in conjunction with appropriate assumptions. The dispersed solid model has been adjusted to the interfacial momentum transfer between reactor coolant and debris. According to the results, the counterclockwise recirculation zone had been formed in the region between sump and connection aisle about 376s after LOCA occurs. The debris thickness accumulated on a sump screen periodically increases or decreases up to 2000s, afterwards its peak decreases.