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**Counter-Current Flow Limitation at Hot Leg Pipe
during Reflux Condensation Cooling after Small-Break LOCA**

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Abstract

The possibility of hot leg flooding is evaluated in case of a small-break loss-of-coolant accident in Korean Next Generation Reactor (KNGR) operating at the core power of 3983 MW normally. The vapor and liquid velocities in hot leg and steam generator tubes are calculated during reflux condensation cooling with the accident scenarios of three typical break sizes, 0.13 %, 1.02 % and 10.19 % cold leg break. The calculated results are compared with the existing flooding correlations. It is predicted that the hot leg flooding is excluded when two steam generators are available. It is also shown that the possibility of hot leg flooding under the operation with one steam generator is very low. Therefore, it can be said that the occurrence of hot leg flooding is unexpected when the reflux condensation cooling is maintained in steam generator tubes.