Small Break LOCA Analysis for YGN 5&6 RCP Trip Strategy in Power Mode Operation

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Abstract

A continued operation of Reactor Coolant Pumps(RCPs) during a Small Break Loss of Coolant Accident(SBLOCA) in all operation mode may increase unnecessary inventory loss from the Reactor Coolant System(RCS) causing a severe core uncovery which might lead to fuel failure. After Three Mile Island Unit 2(TMI-2) accident, the Combustion Engineering Owner Group(CEOG) developed RCP trip strategy called "Trip-Two/Leave-Two" (T2/L2). The T2/L2 RCP trip strategy consists of tripping the first two RCPs on low RCS pressure and then tripping the remaining two RCPs if a LOCA has occurred. This analysis demonstrates the inherent safety of RCP trip strategy during an SBLOCA for Yonggwang Nuclear Power Plant Unit 5 and 6(YGN 5&6). The trip setpoint of the first two RCPs for YGN 5&6 is calculated to be 1721 psia in pressurizer pressure based on the limiting SBLOCA with 0.15 ft^2 break size in the hot leg. The analysis results show that YGN 5&6 can maintain the core coolability even if the operator fails to trip the second two RCPs or trips at the worst time of minimum liquid inventory.