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An Evaluation of Non-LOCA Events with Concurrent Common Mode Failure in Digital Plant Protection System for KNGR

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ABSTRACT

An evaluation has been performed qualitatively and quantitatively to determine the intrinsic capability of the Korean Next Generation Reactor (KNGR) design in coping with non-LOCA transients with concurrent Common Mode Failure (CMF) in the digital Plant Protection System (PPS). A best-estimate analysis methodology has been developed and utilized since design bases events with concurrent CMF in digital PPS are categorized as beyond design bases events. Due to diverse means not affected by CMF and a sufficient available over-power margin in KNGR design, the event consequences are well within the acceptance criteria for the events with CMF. In addition, the KNGR design offers sufficient safety margin against non-LOCA events without operator actions up to 30 minutes after the initiation of an event even with CMF.