

A. Nosovsky, A. Guryev, R. Serafyn, O. Ivaniuk

State Scientific and Technical Center for Nuclear and Radiation Safety, Kyiv, Ukraine

Features of Primary-to-Secondary Leak Accident Management Using Control Valve on HPIS Pressure Side

The features of primary-to-secondary leak accident progression with high pressure injection system (HPIS) flow control using a control valve (CV) compared with HPIS operation without CV were analyzed within the scope of the revised accident management strategy. The management strategy for primary-to-secondary leak accident designed for symptom-oriented emergency instructions of South Ukrainian NPP unit 3 was taken as a basic strategy. The evaluation of CV efficiency applied two modes for CV (pressurizer filling mode and supporting of margin to saturation in the primary system mode), which have been used depending on the stage of the accident (before and after level recovery in pressurizer). Research was carried out for the accident progression without any equipment failures and for the accident with the failures of emergency gas removal system valve in the fully open position. In addition, the experts performed comparative calculations of the integral leak flow for the different diameters of the leak for cases with using and without using CV for HPIS. The calculation results were shown that automated work of the CV can reduce integral leak flow and ensure an adequate margin to saturation in the primary system, but comes with the self-oscillations phenomenon.

Keywords: primary-to-secondary leak, control valve, HPIS.