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Study of the Late Phase of Core Degradation during Reflooding by Safety Injection System for VVER1000 with ASTECv2 Computer Code

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Abstract : This paper presents the modeling approach in SBO sequence for VVER 1000 reactors and describes the reactor core behavior at late in-vessel phase in case of late reflooding by HPIS and gives preliminary results for the ASTECv2 validation. The work is focused on investigation of plant behavior during total loss of power and the operator actions. The main goal of these analyses is to assess the phenomena arising during the Station blackout (SBO) followed by primary side high pressure injection system (HPIS) reflooding of already damaged reactor core at very late 'in-vessel' phase. The purpose of the analysis is to define how the later HPIS switching on can delay the time of vessel failure or possibly avoid vessel failure. For this purpose has been simulated an SBO scenario with injection of cold water by a high pressure pump (HPP) in cold leg at different stages of core degradation. The times for HPP injection were chosen based on previously performed investigations.

Keywords : VVER, operator action validation, reflooding of overheated reactor core, ASTEC computer code
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