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Numerical Analysis of EBR-II Shutdown Heat Removal Test-17 using 1D Plant Dynamic Analysis Code coupled with 3D CFD Code

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After reactor shutdown in sodium-cooled fast reactors, natural circulation in the heat transport systems can be expected to remove the core decay heat in the case of station blackout. For reactor safety, the core hot spot temperature during decay heat removal by natural circulation should be evaluated. In order to evaluate the core hot spot temperature, Japan Atomic Energy Agency is developing a plant dynamics analysis code Super-COPD coupled with a CFD code AQUA to simulate the thermal-hydraulics in the whole plant under natural circulation conditions. As a code validation, the coupled analysis code was applied to an analysis of EBR-II shutdown heat removal test in the cooperation with Argonne National Laboratory. The experiment simulated a protected loss of flow accident by simultaneous trip of the two primary pumps and control rod scram. The numerical results showed good agreement with the measured data.

Country/Int. Organization

Japan/Japan Atomic Energy Agency

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