RELAP5/MOD3.1-REFORC 코드조합을 이용한 안전밸브 후단 배관의 열수력 동하중 계산

Thermo-hydrodynamic Loads Calculation of Safety Valve Discharge Piping Using a Code Combination of RELAP5/MOD3.1-REFORC

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요약

RELAP5/MOD3.1-REFORC 전산코드 조합을 이용하여 EPRI Test 917 실험에 대해 안전밸브 후단 배관의 열수력 동하중 계산을 수행하였으며 실험 결과와 비교 평가를 수행하였다. RELAP5/MOD3.1-REFORC 분석 결과, 밸브 직후단 배관을 제외한 각 직관의 압력 및 동하중은 EPRI Test 917 실험 결과와 유사한 경향을 나타내었다. 따라서, 적합한 RELAP5 Option을 사용하고 REFORC 분석 결과에 적절한 여유도를 적용한다면, Loop Seal에 고온의 물이 존재하는 안전밸브 후단 배관 열수력 동하중 계산에 RELAP5/MOD3.1-REFORC전산코드 조합을 적용할 수 있을 것으로 판단된다.

RELAP5 Simulation of the Steam Generator Secondary-Side Depressurization Test B8522 in the RD-14/12 Test Facility

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ABASTRCT

A steam generator secondary side break experiment conducted in the RD-14/RD-12 test facility is simulated with the RELAP5/MOD3.2 computer code. Since the development of RELAP5 code was subjected to simulate thermal-hydraulic transient for pressurized light water reactors, it has not been applied to assess the safety analyses of CANDU reactors up to date. The objective of this study is to verify the applicability of the RELAP5/MOD3 to CANDU reactors by simulating as a steam-line depressurization in steam generator in terms of the thermal-hydraulic transient. The results from simulations of RELAP5/MOD3.2 are compared with both experimental data and those of CATHENA simulation undertaken by AECL. It is concluded that the RELAP5/MOD3.2 computer code enables to predict the major physical phenomena on the transient in regards to the steam line break experiments in terms of qualitative and quantitative aspects. However, some discrepancies in the depressurization of the secondary-side and the liquid level perturbation in the steam generator secondary-side after the break were observed.

Key Words: RELAP5, RD-14 Test, CANDU reactor, simulation, B-8522