

A Comparative Assessment Result of B9401 Multi-channel RIH
Break Experiment with Canadian Test Facility RD-14M
using RELAP5/MOD3 and RELAP5/CANDU+

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ABSTRACT

The experiment, B9401, performed in RD-14M multi-channel experimental facility, was preliminarily analyzed using RELAP5/MOD3 and RELAP5/CANDU+ and compared with experimental results. The RELAP5 code has been developed for best-estimate transient simulation of pressurized water reactors and associated systems, but the RELAP5/CANDU+ code has been developed since 1998 in order to have auditing tool of CANDU NPP. The RELAP5/CANDU+ code is under developing and they have not been assessed much for a CANDU reactor. Therefore, this study has been initiated with an aim to identify the code applicability in a CANDU reactor by simulating some of the tests performed in the RD-14M facility and to get the assessment results for RELAP5/CANDU+ code. The RD-14M test facility at Whiteshell Nuclear Research Establishment is a full-scale multi-channel pressurized-water loop. The RD-14M is not a "scale" model of any particular CANDU reactor. It possesses many geometric features of a CANDU reactor heat transport system, and is capable of operating at conditions similar to those expected to occur in a reactor under normal operation and some postulated accident conditions. As preliminary results, the RELAP5/MOD3 and RELAP5/CANDU+ analyses demonstrate the code's capability to predict reasonably the main phenomena occurring in the transient, in qualitative view. In quantitative view, the RELAP5/CANDU+ predicted better than that of RELAP5. However, some discrepancies after emergency coolant injection, the behaviors of the ECI mass flow rate and the sheath temperatures were observed commonly.