10. APPLICATION OF THE RELAP5-3D CODE IN SUPPORT OF THE NPP UNITS SAFETY ANALYSIS IN UKRAINE

A. M. Shkarupa, I. N. Kadenko

Major part of calculations for transient and accident sequences for Ukraine NPP units has been performed with computational codes based on point neutron kinetics and one dimensional thermohydraulics. Such an approach does not allow modelling the mixing processes in reactor pressure vessel caused by coolant flow of separate loops. As a rule, the limitations in modelling considered have been balanced by corresponding choosing of conservative initial and boundary conditions. When three-dimensional thermohydraulics-neutronics coupled codes became available and local spatial effects started to be considered without significant simplifications there is a motivation and basis to reconsider the conservative results of earlier calculations, taking into account the operational experience of NPP units. This paper deals with results of RELAP5-3D code analyses of the OECD/DOE/CEA V1000CT-2 benchmark and some computational scenarios, for which the calculations have been performed under Rivne Unit 1 and Zaporizhzhya Unit 5 in-depth safety analysis projects sponsored by the US DOE for NNEGC "ENERGOATOM". Based on the computational scenario for accident "Main Steam Line Break" the influence of reactor vessel nodalization on modelling of coolant mixing and, as a consequence, on results of the computational analysis is shown.