

RBMK Coupled Neutronics/Thermal-Hydraulics Analyses by Two Independent Code Systems

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Abstract

This paper presents the coupled neutronics/thermal-hydraulics activities carried out in the framework of the part B of the TACIS project R2.03/97, “Software development for accident analysis of RBMK reactors in Russia”. Two independent code systems were assembled, one from the Russian side and the other from the Western side, for studying RBMK core transients.

The Russian code system relies on the use of code UNK for neutron data libraries generation and the three-dimensional neutron kinetics thermal-hydraulics coupled codes BARS-KORSAR for plant transient analyses. The Western code system is instead based on the lattice physics code HELIOS and on the RELAP5-3D© code. Several activities were performed for testing code system’s capabilities: the neutron data libraries were calculated and verified by precise Monte Carlo calculations, the coupled codes’ steady state results were compared with plant detectors’ data, and calculations of several transients were compared.

Finally, both code systems proved to have all the capabilities for addressing reliable safety analyses of RBMK reactors.

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