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System of coordinated calculation benchmarks for a fast reactor with sodium coolant in closed fuel cycle

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System of benchmarks of the class “tests” with prototype for neutron-physical and thermal hydraulic calculations of the BN-type reactors with nitride uranium-plutonium fuel is presented. The system includes benchmarks for models: cell, fuel assembly with end elements, active core, protection of the reactor installation. The system is intended for verification of the codes including constant support, methods and algorithms of calculation, multiphysics scheme of calculations, scenarios of operation in closed fuel cycle. World experience of creation of the calculation benchmarks was used for the development of this system. Tasks of analysis of nonlinear deformations of the active core and transition of the reactor to the equilibrium mode of operation are included. Formulation of test tasks was based on the following principles: conformance of the benchmark model with the range of studied effects, founded rejection of unnecessary detail in models and material compositions, uniform information for construction of geometric models and the agreed size. System combines 6 types of benchmarks. The results of benchmark calculations made by the authors using codes CONSYST (ABBN-RF), MCU, JARFR, MMK, SCALE, SERPENT are presented.

Country/Int. Organization

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