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## CALCULATION AND EXPERIMENTAL ANALYSIS OF NEUTRONIC PARAMETERS OF THE BN-800 REACTOR CORE AT THE STAGE OF REACHING FIRST CRITICALITY FOLLOWED BY RATED POWER TESTING

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The main task of the measurements at different stages of the reactor start-up (first criticality, first start and further testing of the rated power) is to obtain complete and accurate information on the monitored neutronic parameters of the core. It is essential for subsequent reactor operation and also helps to verify and improve the accuracy of calculating neutronic parameters.

Insertion of the start-up neutron source initiated BN-800 first criticality which continued till the start-up project core formed, including neutronic measurements carried out under conditions of both the minimum critical mass and start loading, at the minimum controllable power level. Then, measurements were performed at different power levels during the no-load stage (when the turbine-generator was connected to the grid, the reactor power reaching 25% of the design level, i.e. until the reactor power start-up) and the on-load stage (when the rated power was reached).

Analysis of the results of the performed measurements showed that experimental and calculated values agree well (within the declared design and experimental uncertainties):

- the minimum critical loading is determined very precisely and the start critical state is predicted with high accuracy;
- agreement between the calculated and experimental values of CR worths is proved;
- regulatory compliance for reactivity balances is confirmed;
- agreement is achieved between the calculated and measured values of fission reaction rate distribution (relative power density) in the core;
- calculated estimations of temperature and power reactivity coefficients, reactivity effect due to fuel burnup and neptunium reactivity effect are confirmed by the measurement results.

Calculation methods used for the experimental analysis are similar to those employed for design justification of the core neutronic parameters.

The obtained results of the measurements and of their calculation analysis will be used in cross-verification of the GEFEST-800 computer code designed for the calculation monitoring of BN-800 core operation.

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