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Models and Methods for Automated Control of Power Change at WWER-1000 Power Unit

This work is devoted to the development of automated control models and methods of power change at WWER-1000 power unit to provide the most stable axial offset in the load-following mode. Improved multi-zone mathematical model of WWER-1000 allows taking into account the energy release of ²³⁵U nuclei fission as well as ²³⁹Pu and includes a sub-model with distributed parameters.

The automated control method of power change at WWER-1000 power unit that uses three control loops was proposed for the first time. The first loop maintains change of reactor power by controlling the boric acid concentration in the primary coolant. The second control loop maintains the required value of axial offset by controlling the position of 9th group control rods, and the third one maintains coolant temperature mode or steam pressure mode by controlling the main valve positions in the turbine generator.

Keywords: method of automated control, control models and methods, NPP, mathematical model, ²³⁵U, ²³⁹Pu, control loop, automatic control system, WWER-1000.