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Specific features of BN-1200 core in case of use of nitride or MOX fuel

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The core of a commercial reactor BN-1200 designed for operation with developed MOX-fuel or advanced nitride fuel. The common approach to the design of the specified cores was:
- reduction of the fuel rating, in comparison with BN-600 and BN-800, which permits to use larger fuel pins (Ø 9.3 mm) to reduce their consumption and minimizing reactivity margin for fuel burn-up;
- use of the fuel with the same plutonium enrichment for all FA to ensure stability of the core power density during operation between refueling and simplification of the fuel fabrication;
- use of FA design with top sodium cavity and born absorption shield for minimizing sodium void reactivity effect;
- an annual interval of operation between refueling is accepted.
In view of difference of neutron physical characteristics of the nitride and MOX-fuel the specified variants of the core have differences in the design:
- in case of operation with nitride fuel the plutonium breeding rate in the core is self-sufficient, and in comparison with the MOX-fuel core, it has no frontal and lateral breeding zones. To reduce reactivity margin and additionally equalize power density for peripheral FA there are used larger diameter (Ø 10.5 mm) fuel pins;
- configuration of the MOX-fuel core has axial breeding layer to reduce reactivity loss rate due to fuel burn-up and to ensure annual operating interval between refueling. Additional advantage of this configuration is the reduction of the accumulation rate of the damaging dose.

Country/Int. Organization

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