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# Basic principles for lifetime and structural integrity assessment of BN-600 and BN-800 fast reactors components with regard for material degradation

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The present paper overviews the basic principles of Russian Standard elaborated for justification of lifetime prolongation of BN-600 fast reactor (FR) and for justification of design lifetime of BN-800 FR. These principles are based on the analysis of the main mechanisms of material damage under service and formulation of the limit conditions for different components of FR of BN type.
Various mechanisms of material damage under service are considered. In particular, intergranular fracture is considered for a case when material is undergone mechanical loading and neutron irradiation simultaneously. Fatigue under neutron irradiation and creep is also considered. Embrittlement of a material is taken into account caused by thermal aging, neutron irradiation and swelling. Different critical events are formulated as corresponding to different damage mechanisms, and the methods for their analysis are developed. The trend curves are presented for prediction of the physical and mechanical properties of the materials used for the BN reactor components.
Limit condition of a reactor component is formulated as a loss of structural integrity or serviceability of this component that is caused by some set of the critical events for this component. The limit conditions are formulated and represented for the main components of FR of BN type.

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