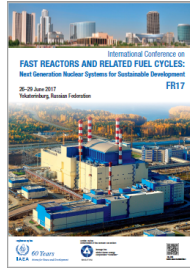


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Complex discussion of inherent safety fast reactors start-up with enriched uranium concept (strategical, economical aspects, problems of neutron physics etc.). R&D program proposal

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Due to the growing population of Earth, the development of a full-scale nuclear power industry is becoming an increasingly challenging task in the 21st century and onwards. The Breakthrough («Proryv») Project is focused on inherently safe fast reactors which are expected to resolve, for a first time, the economic competitiveness problems of the nuclear power sector. In order to develop a full-fledged nuclear power industry based on such reactors within acceptable timeframe, these reactors must first be put into operation with enriched uranium.

The article provides the results of systemic calculations confirming this thesis. Moreover, it supports the economic benefits (in the nearest future) of the uranium-based start of fast reactors versus the uranium-plutonium start. For the first time, it demonstrates the possibility of a noticeably simpler transition from uranium fuel-based start to uranium-plutonium regime in the closed fuel cycle compared to the previous alternatives (reduced number of structural changes in the core during the transient mode, less restrictive requirements to the start load, etc.). An R&D program is proposed in order to justify the start of inherently safe fast reactors on enriched uranium.

Country/Int. Organization

RUSSIAN FEDERATION / Private institution «Innovation and technology center for the «PRORYV» project»

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