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# Rosatom plans to use higher enriched Uranium for enhanced efficiency of NPPs

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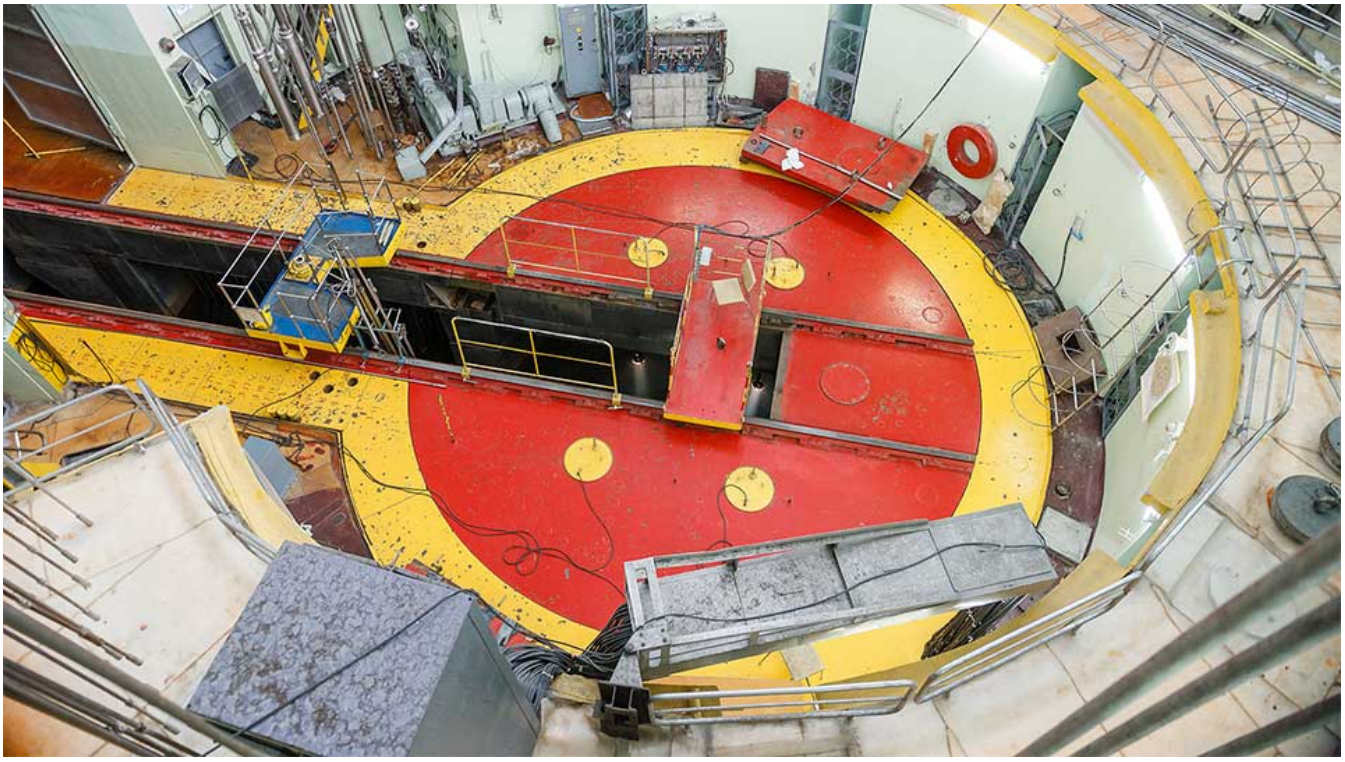

For the first time, Russian scientists have started reactor testing of nuclear fuel with 5% enriched Uranium-235 and a new type of neutron absorber (Erbium) for VVER reactors. The purpose of the experiment is to enhance the efficiency of nuclear power plants.

At present, the main fleet of nuclear commercial reactors worldwide is running on nuclear fuel with of less than 5%, which now meets international standards for capacity reactors fuel (except for fast reactors, small-scale NPPs, and research reactors).

Nuclear fuel with above 5 % enrichment Uranium-235 has a significant potential for increasing the economic efficiency of nuclear power facilities and improving the competitiveness of NPPs compared to other energy sources. According to Rosatom engineers, it will enable to extension the reactor refueling period from the current 12-18 months to

24 months, i.e. power units will be stopped less often to replace irradiated fuel bundles with fresh ones and produce more electricity annually. Additional economic impact could also be obtained by reducing the number of fresh fuel bundles in a reload batch.

“Increasing Uranium enrichment to 6%, and in the long term to 7-8 %, is a global trend and a task that the industry leaders are working on. So far, reactor efficiency has been improved by introducing new designs and modifications of fuel assemblies. Most of these innovations have been aimed at increasing the physical volume of enriched Uranium fuel elements and ultimately producing more energy from a single fuel bundle. The industry has now reached a fork in the road where further enhancing of NPP performance probably requires crossing the 5 % enrichment threshold for high-capacity thermal reactors. Considering that there are 163 fuel assemblies in the core of the modern VVER reactors, and each of them contains more than 500 kg of uranium, the impact from increasing enrichment by just 1 % will already be very significant,” said Alexander Ugryumov, Vice President for Research and Development at TVEL Fuel Company of Rosatom.

For the research program, an experimental assembly consisting of 12 VVER-1000 size fuel elements with uranium-erbium matrix has been manufactured. This is the first time that VVER fuel with uranium-erbium matrix has been loaded into any reactor.

According to the estimates, Erbium is better suited as a neutron absorber for the operation of fuel with an enrichment above 5 % in comparison to Gadolinium, which is used as a regular absorber for VVER reactors.

The results of the research will contribute to the development of a technology for batch production of uranium-erbium fuel for VVER reactors, as well as validation of such fuel introduction at NPPs of Russian design.