

Rosatom installs a 4th generation NPP reactor

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Rosatom has started installing a fast neutron BREST-OD-300 reactor in a power unit at the Pilot demonstration energy complex (PDEC) at Seversk of West Siberia. The PDEC is located at Siberian Chemical Combine, an enterprise of TVEL Fuel Company of Rosatom.

A 300 MW NPP powered by the lead-cooled BREST-OD-300 fast reactor, based on the principles of “natural safety”. The PDEC facilities are developed under Rosatom’s strategic “Proryv” project, which means Breakthrough. In addition to the power unit, it also includes facilities for the on-site closed nuclear fuel cycle – a unit for the fabrication of uranium-plutonium nitride fuel, as well as a unit for reprocessing irradiated fuel.

“Unlike traditional light-water VVER thermal reactors, BREST-OD-300 reactor’s vessel is not an all-metal structure, but a metal-concrete structure with metal cavities to accommodate the primary circuit

equipment. In addition, the BREST vessel is larger and can be delivered only in parts, and the final assembly is possible only at the PDEC construction site,” said Vadim Lemekhov, Chief Designer of the BREST-OD-300 reactor unit.



The advantage of fast reactors is their ability to efficiently use the fuel cycle's secondary byproducts (in particular, plutonium) for energy production. At the same time as having a high regeneration factor, fast reactors can produce more potential fuel than they consume and burn out (i.e., use in the energy generation process) highly active transuranic elements (actinides).

The features of the fast reactor made it possible to abandon the melt trap, and a large volume of support systems, and to lower the safety class of the non-reactor equipment. The integral design and physics of the reactor facility enable to exclusion of accidents requiring evacuation of the population. In the future, such installations should not only enhance the safety of nuclear power but also make it more economically competitive in comparison with the most efficient thermal power generation (in particular, steam-gas technology).

The BREST-OD-300 reactor will get its main energy component plutonium-239, reproducing it from the isotope uranium-238.

Uranium-238 is about in nature (more than 99%), while Uranium-235 makes about 0.7% of natural uranium that is currently used to produce energy in thermal reactors.