The Bangladesh Monitor - A Premier Travel Publication

Rosatom starts implementing a fourth-generation nuclear power complex

- A Monitor Desk Report Date: 02 January, 2025

Construction of a Pilot Demonstration Energy Complex (PDEC) is underway on the site of the Siberian Chemical Combine (an enterprise of Rosatom's Fuel Division), in Tomsk region, Russia. This will include three unique interconnected facilities: a unit for the manufacturing (fabrication/refabrication) of dense nitride uranium-plutonium nuclear fuel, a nuclear power plant with an innovative fast neutron lead-cooled reactor BREST-OD-300, and a unit for reprocessing of irradiated fuel.

For the first time in global practice, an NPP with a fast reactor and a stationary closed nuclear fuel cycle will be built on one site. After reprocessing, irradiated fuel will be sent for re-manufacturing of fresh fuel. Thus, this system will become practically autonomous and independent of external supplies of energy resources.

First of the three facilities of the PDEC- a unit for fabrication/re-

fabrication of nuclear fuel for the innovative BREST-OD-300 fast neutron reactor was put into pilot operation. The cutting-edge fully automated facility has already successfully manufactured the first mockup fuel bundles of the BREST-OD-300 reactor with depleted uranium nitride fuel pellets.

After the regulator approves the handling of plutonium, the unit will start production of the target product – mixed dense nitride uranium-plutonium fuel (MNUP fuel). Prior to the initial core loading of the BREST-OD-300, more than 200 MNUP fuel bundles are scheduled for fabrication.

A unique technology for the fabrication of uranium-plutonium nitride fuel was developed in Russia by Rosatom scientists. The trial assemblies with experimental MNUP fuel elements were successfully tested in the BOR-60 fast research reactor, as well as in the commercial BN-600 fast reactor at the Beloyarsk NPP.

“At this moment, Rosatom has the world’s furthest advancement the in development of Generation IV nuclear technologies. According to the IAEA classification, this implies higher efficiency in the use of fuel raw materials, increased safety standards for the operation of nuclear plants, as well as a significant reduction in the amount of nuclear waste generation. All these principles are fully consistent with the technological solutions adopted at the Pilot Demonstration Energy Complex,” commented Alexey Likhachev, CEO of Rosatom State Corporation.

BREST-OD-300 will be the world’s first lead-cooled fact reactor, its architecture is based on the principles of so-called natural safety. The reactor’s efficiency will also be ensured through the use of innovative MNUP fuel. It consists entirely of secondary products of the nuclear fuel cycle – depleted uranium and plutonium. It will reprocess irradiated fuel assemblies to produce fresh fuel instead of storing them, and to radically reduce the generation volume of nuclear waste and its activity level.