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Manufacture, Installation and Adjustment of the BN-800 Reactor Plant Equipment

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The construction of Power Unit No. 4 with the BN-800 reactor plant at the Beloyarsk NPP is the crucial stage in the industrial-scale development of the sodium-cooled fast neutron reactors (SFR).

The activities on the development of the BN-800 reactor plant commenced in 1980.

During the period from 1993 to 2005 and later on until the equipment deliveries started, the activities were being in progress to check the engineering solutions of the design in test facilities.

To substantiate the reactor plant safety, more than 150 unique R&D activities were accomplished mainly in full-size test facilities.

Also, individual assemblies and elements of equipment were tested on mockups. The processes were being developed to fabricate individual assemblies of equipment, assemble and install articles, ensure interactions of sets of devices and mechanisms.

Contracts between Rosenergoatom Concern and OKBM provided for fabrication and delivery of more than 150 items of equipment and systems:

reactor vessel;

heat exchange equipment;

CRDMs;

fuel handling equipment;

purification system equipment;

primary and secondary sodium pumps, electromagnetic pumps and their control systems;

secondary pipelines and ECDS;

sodium tanks, 10–150 m³;

sodium valves;

metal structures of the reactor compartment;

non-standard equipment of the reactor plant;

dummy fuel subassemblies (FSA); hot cell equipment;

sodium technology instrumentation;

ionization chambers;

According to the adopted process, the equipment is installed in the Power Unit using two basic methods:

1. Installation work conjoined with the erection of the building

2. Modular installation work on large-size equipment

The modular installation work is basically done on the reactor vessel. In a specially erected Reactor Vessel Assembly Building (RVAB), more than 230 supplied units were pre-assembled into the 6 mounting modules that were later transported to the construction site and installed into the reactor pit.

The preoperational adjustment activities on the BN-800 reactor plant before the in-house electricity is generated were performed according to an individual work schedule with the reactor plant equipment attributed to a startup complex. The startup complex ensured that the equipment and systems of the nuclear power station were ready for the gas heatup of the reactor, sodium filling of the reactor and FSA loading into the core with building up the minimum critical mass.

The completed deliveries, installation and adjustment work made it possible to accomplish the following in

2013-2016:
preoperational adjustment activities;
first criticality;
pilot industrial operation

Country/Int. Organization

Russia/JSC "Afrikantov OKBM"

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