CURRENT STATE OF WORK ON THE DEVELOPMENT, MANUFACTURING AND SUPPLY OF ITER POWER SUPPLY SYSTEM EQUIPMENT [[1]](#footnote-1)\*)

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One of the most important activities of JSC “NIIEFA” is the work execution under a package of intergovernmental Procurement Arrangements of high-tech products to ensure the in-kind contribution of the Russian Federation to the ITER project in terms of development, research, manufacturing and supply of equipment for superconducting magnetic coil power supply systems, including switching equipment, high-current and high-voltage busbars, energy dissipating resistors, control and diagnostic systems and digital complexes for measuring currents and voltages.

The most important part of the Procurement Arrangement is the unique switching equipment that provides both an operating current switching needed to create the vortex electric field that initiates the plasma discharge and a fast discharge of energy stored in the superconducting coils in the case of a quench. JSC “NIIEFA” is to manufacture and supply to ITER more than 200 switches of various types, including devices using compressed gas energy and induction-dynamic drive for switching, devices using explosive detonation energy, as well as devices based on various semiconductor switches.

In addition, the scope of supply includes 5.3 kilometers of high-current aluminum busbars weighing over 900 tons along with support structures and expansion joints, energy dissipating resistors weighing a total of 1,336 tons, and over 50 kilometers of low-inductance coaxial cables. The vast majority of the equipment under the Procurement Arrangement is manufactured by the NIIEFA plant.

Between 2014 and 2020 JSC “NIIEFA” successfully defended detailed design review for all components of power supply systems, except for the equipment important for ITER radiation safety, which allowed to proceed to the manufacturing stage and successfully fulfill obligations of the Russian Federation to supply equipment for installation at the ITER site. The first shipment of the equipment took place at the end of 2015.

As of the end of 2022, JSC “NIIEFA” has shipped to ITER 182 trailers with power supply system equipment weighing a total of 1,812 tons, including 49 trailers in 2022. This allowed to complete the installation of all equipment in the AC/DC Converter Buildings, to install busbars in the Diagnostics Building on Level B2, including the busbars passing through the confinement barrier with the Tokamak Building. In addition, JSC “NIIEFA” supplied a significant part of the switching equipment for Level B2 of the Diagnostics Building, the installation of which will begin in the near future.

At the same time, NIIEFA specialists are actively working on qualification tests of equipment of the TF coil power supply system (important for ensuring ITER radiation safety) in terms of resistance to the effects of permanent magnetic field, extreme values of environmental factors and accelerations occurring during earthquakes.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/E/ru/IC-Enikeev.docx) [↑](#footnote-ref-1)