Atomenergomash completes world's most powerful research reactor test assembly Phase I

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AEM-Technology has completed the 1st phase of the test assembly of the world's most powerful fast neutron research reactor (abbreviated as MBIR in Russian) at the Atomic Reactor Research Institute (NIIAR) facility, Dimitrovgrad, Russia.

"A unique piece of equipment — a unique undertaking; and Atommash is undoubtedly up to the challenge." That is according to Vyacheslav Pershukov, Rosatom's representative for international and scientific projects. He continued by saying: "This is very challenging for the entire Rosatom company, especially with the great volume of international orders. Since it is so unique, the MBIR is not a priority for us from the commerce perspective, but it is a priority from the point of view of reputation."

A 20-meter deep caisson was used for the test assembly. During this operation, the reactor vessel was installed on special support using a crane, after which the height of the assembly unit exceeded 10 meters, with a diameter of 4 meters and a weight of 60 tons. A basket was installed inside the vessel. Its intended purpose is for separating the coolant flows entering and leaving the reactor, cooling the reactor vessel and its internals, as well as placing additional parts. The weight of the basket is 25 tons, with a length over 5 meters, and a diameter of 3 meters. In some areas, a uniform 70-mm gap was required between the vessel and the reactor basket.

"The MBIR is a unique integrated project in which several enterprises of the group take part: Atommash, Petrozavodskmash, and the Petrozavodskmash Foundry which has taken part in the manufacturing of large-sized castings. Non-standard equipment always requires new tools and technical solutions that have been developed and used by our experts," said Atomenergomash CEO, Andrey Nikipelov.

Given that the metal walls of the MBIR vessel are only 25 mm to 50 mm thin, with a diameter of 4 meters (compare: the thickness of the VVER-1200 reactor casing is 300 mm), there is the risk of equipment geometry changing during processing. Specialized in-house equipment was used to ensure that the required parameters were met throughout the reactor manufacturing process.

The multipurpose fast neutron research reactor (MBIR) is going to be the most powerful research reactor in the world, including those that are currently operational and any others that might be under construction or in the design stage. The thermal capacity of the new sodium-cooled reactor will be 150 MW.

The unique technical specifications of the reactor will facilitate easy resolutions to a wide range of research tasks in an effort to support the creation of new, competitive and safe nuclear power plants, as well as fast neutron reactors for conducting closed nuclear fuel cycle reactions. The duration of each research period in the MBIR is going to be several times shorter when compared to existing reactors.

The construction of the reactor is believed to provide a modern and technologically advanced research infrastructure to the nuclear industry that will last for the next 50 years.

The next steps in the manufacturing of the research reactor will be hydro-testing and assembling the protective casing, followed by the second phase of the test assembly including all the internal elements.

The Atomic Reactor Research Institute was granted the license for the construction of the multipurpose fast neutron research reactor on May 8, 2015. The start of construction was reported on March 27, 2017, with the commissioning of the reactor scheduled to take place after 2024.

“This is an interesting project for us, an opportunity to find new and effective solutions. We can say that a new page of the history of nuclear energy is being written at our facility today. The MBIR is a fundamentally new product, and all operations carried out by the AEM-Technology team are being implemented for the first time,” said Igor Kotov, AEM-Technology CEO.

For more information, please visit Atomenergomash Group website at www.aem-group.ru or contact the company’s Corporate Communications office at corpcom@aem-group.ru.