



Akkuyu Construction Kicked Off

Another landmark event took place on the construction site of Turkey's first nuclear power plant as the official groundbreaking ceremony was staged to mark the beginning of construction after the limited construction permit was issued by the Turkish regulator. For more details on the event read our report.

The ceremony took place on 10 December and was attended by Alexey Likhachev, Chief Executive Officer of Russian nuclear corporation Rosatom, and Fatih Dönmez, Deputy Minister of Energy and Natural Resources of Turkey. Concreting of the foundation for the nuclear island facilities

is an important part of the preparatory phase. The limited construction permit enables the contractor to start construction and installation operations at any facility on the nuclear plant's site, except for the facilities that are crucial for safety of the nuclear island.

"I see that the ceremony is also attended by local people, and I would like to take this opportunity to thank you for your support. Rosatom has decided to establish a community council to foster the dialog on Akkuyu and involve local communities in the project implementation. We have almost a century of cooperation ahead while the power plant generates clean energy for Turkey," Alexey Likhachev said.

Fatih Dönmez, Deputy Minister of Energy and Natural Resources of Turkey, said, "We expect this region to flourish in a few years. A good example is the

Novovoronezh Nuclear Power Plant, which is a reference project for the Turkish plant. In 1959 when its construction started there were as few as 3,000 people living. Now it is a city with the population of 30,000. We expect the same to happen here.”

On 2 December 2017 the site was fully prepared for the concreting of a reactor foundation slab to start at the power plant’s Unit 1. This task was completed right on schedule by a Turkish company.

The limited construction permit allows the contractor to begin ground works on the site of Unit 1, make preparations for the concreting of basemats for main and auxiliary buildings and structures, do site grading and leveling work, fill in the Akkuyu Bay up to level +10.5 m, and construct Eastern and Western cargo terminals, Eastern and Southern catchwater drains, temporary buildings and structures, a fire station, fire water reservoirs, and a fire pump station.

In March 2018, Akkuyu Nükleer plans to obtain a construction license that will enable it to begin the foundation slab concreting. The first concrete will be an official beginning of the main construction process.

Apart from construction operations, the work is ongoing on the site to monitor the environment, including seismic and meteorological parameters, underground water and sea conditions. All operations on the Akkuyu site are performed in

accordance with Turkish national laws and coordinated with the Turkish Atomic Energy Authority.

Local potential

The Akkuyu construction project offers numerous opportunities to Turkish suppliers. They are expected to do about 35–40% of the Akkuyu construction work for 6–8 billion US dollars. Over 350 local companies have applied for inclusion in the list of potential suppliers, and some of them have already won contracts to build infrastructure for the nuclear power plant.

At present, there are more than 300 people working on the site, with 90% of them being Turkish nationals from the neighboring communities of Büyükeceli, Silifke, Taşucu and Aydınçık. Highly qualified engineers involved in the construction process were hired from Turkish companies previously engaged in major power generation and industrial construction projects in the Republic of Turkey

For reference:

Turkey’s first nuclear power plant is constructed in accordance with the framework agreement signed by the Russian Federation and the Republic of Turkey in May 2010. The Akkuyu NPP project provides for four 1,200 MW reactor units to be built based on the design of Novovoronezh II (Voronezh Region, Russia). The power plant will have a service life of 60 years.

COOPERATION

Notice to proceed contracts signed for El Dabaa NPP

Notices to proceed contracts for El Dabaa NPP construction signed in the presence of Presidents of Russian Federation and Egypt.

On December 11, 2017, Director General of Rosatom State Atomic Energy Corporation Alexey Likhachev and Egypt's Minister of Electricity And Renewable Energy Mohamed Shaker signed the Notices to proceed the contracts for the construction of the El Dabaa nuclear power plant.

The signing ceremony was held in the presence of the President of the Russian Federation Vladimir Putin and the President of the Arab Republic of Egypt Abdel Fattah El Sisi.

According to the signed contracts, Rosatom will build four VVER-1200 units of the El Dabaa NPP in the Matrouh region on the Mediterranean coast, as well as supplying nuclear fuel throughout the plant's entire operational lifetime. This will help ensure competitive electricity pricing in Egypt over a period of 60 years. Rosatom will also be conduct personnel training and will assist its Egyptian partners in the operation and maintenance of the El Dabaa NPP for the first ten years of its operation. As part of yet another contract, the Russian side will construct a purpose-built storage and supply containers for storing spent fuel.

The first unit of the El Dabaa NPP is to be commissioned in 2026.



‘The contracts we’ve signed are a record-breaking deal in the history of the nuclear industry. The total cost of all four contracts amounts to billions of US dollars, also being the biggest non-feedstock deal in Russian history. We offered our partners in Egypt a unique comprehensive agreement that spans the power plant’s entire life cycle, i.e. 70 to 80 years. Today Rosatom is the only company in the world that is capable of providing the full range of peaceful nuclear services. The development of Egypt’s nuclear power industry is also important to Russia’s economy as dozens of Rosatom enterprises will be awarded significant contracts and will have an opportunity to showcase to the global community the advantage of Russian nuclear technologies’, said Director General of Rosatom Alexey Likhachev,

As part of the El Dabaa NPP project implementation, Rosatom will also aid Egypt in developing its nuclear infrastructure, as well as increasing the level of project localization and supporting Egypt in training nuclear cadre and driving the public acceptance of nuclear power. The training of future NPP employees will be conducted in both Russia and Egypt. Over the next few years, hundreds of Egyptian students will study nuclear disciplines in Russia.

The construction of the El Dabaa NPP will provide a stimulus for Egypt’s industrial development, with several dozens of Egyptian companies to be involved in the

construction. The construction of the first unit is expected to have a localization level of at least 20%, while further units will be even more localized.

The 1,200 MWe reactor unit is a modern, internationally referenced Generation 3+ nuclear power plant that is fully compliant with post-Fukushima IAEA requirements and already implemented in Russia. On December 8, 2017 first

criticality procedures was begun at the innovative Unit 1 of Leningrad NPP-2, a generation 3+ plant, that is referential to “El Dabaa” NPP project. Leningrad NPP-2 operating personnel successfully loaded the first of the 163 fuel assemblies with fresh nuclear fuel. Earlier, on August 5, 2016 the world’s first innovative Generation 3+ nuclear power unit was connected to the grid at the Novovoronezh NPP in Russia.

CONSTRUCTION

Two Reactors Started Up in Seven Days

Two nuclear generation projects in Russia made a step forward to completion as the reactor startup process was initiated at Rostov NPP Unit 4 and Leningrad II Unit 1 in early December.

The fuel loading at Rostov Unit 4 began on 6 December to mark the beginning of the reactor startup phase. The standard procedure of this phase includes fuel loading, initiating a controlled chain reaction, going critical, and carrying out all the required tests. During the startup phase, engineers also check operating parameters of the reactor. According to Andrei Petrov, CEO of RosEnergoAtom, expertise gained from the construction of the southernmost nuclear plant in Russia is ‘truly unique’. “This is unprecedented. The Rostov Nuclear Power Plant is the only one in modern Russia to have started up three reactors on one site in just seven years – Unit 2 in 2010, Unit 3 in 2015 and Unit 4 this time,” Petrov said.

“The reactor is coming to life this very second; its life has started. The fourth unit is breathing, operating and will soon generate its first kilowatt hours for the national power grid,” said Andrei Salnikov, Director of Rostov NPP.



In less than a week the same reactor startup process began at Unit 1 of Leningrad II. A total of 163 fuel assemblies was loaded into the reactor core. According to Andrei Petrov, CEO of RosEnergoAtom, the beginning of the startup phase means that all construction and installation operations at the first unit of the new power plant have been completed. “The fuel loading systems are now operating automatically, and all of the operations meet the required safety standards. In just 30 days the reactor will be prepared to go critical. We will carry out necessary tests and then proceed with initiating a controlled chain reaction in full compliance with the startup procedure. The next step will be to bring the unit online. This is expected to be done next year,” he said.

Fuel has been loaded into two reactors. It means that the fuel loading process has been completed.



**Alexey Likhachev,
Chief Executive
Officer, Rosatom**

“It is the first time in the history of modern Russia that two reactors – one at Leningrad II and the other at Rostov NPP – have been started up within a week. It is important to note that the two reactor startups fully meet the time schedule and project budgets. Rostov Unit 4 features a legendary, time-proven VVER-1000 reactor. Dozens of the same design reactors operate all over the world. This design was initially developed in the Soviet Union and has undergone several improvements since then. It is extremely reliable, simple and efficient and meets the latest safety standards.

VVER-1000 reactors have high safety margins and a service life of several decades. But everything has its time, and today we have started up the last unit with a VVER-1000 reactor. Leningrad II Unit 1 has a different, VVER-1200 reactor belonging to the so-called Generation III+ reactors. Its innovative design incorporates time-proven engineering solutions on the one hand and the latest developments in efficiency and safety on the other. VVER-1200 is a totally new reactor that employs innovative solutions sought after in Russia and other countries. In fact, we are witnessing a change of generations in the nuclear industry, and this moment is somewhat emotional for those who work in the industry.”

EVENTS



In Pursuit of New Businesses

Rosatom has set a goal of increasing the share of new products to 30% of total revenue by 2030. New business prospects for the Russian nuclear corporation were discussed at the Rosatom New Products forum.

In late November, Rosatom organized a forum devoted to its new products and businesses. “New products are what we use to expand our footprint in the Russian Federation and on international markets and acquire new capabilities. Five years have passed since Rosatom began looking

into new business areas and opportunities. Three years ago new products were named one of Rosatom’s three priorities of business development. We have achieved impressive results by now, but will continue to capitalize on the existing achievements and acquire new competencies in our key markets,” said Oleg Barabanov, Director for Development and Restructuring at Rosatom.

Kirill Komarov, Rosatom’s First Deputy CEO for Corporate Development and International Business, told the audience about the prospects of new business development. He said that Rosatom had set a goal of increasing the share of new products to 30% of total revenue by 2030. “We are progressing well towards this goal, but still need to improve our performance in new business areas. It is true that our plans for the future are ambitious as we want to grow 14% on the annual average. But I personally think that this target is achievable,” he concluded.

Other high-profile speakers at the Forum with reports on composite materials, digital economy and energy storage systems were senior experts from Umatex Group, Strategic Development Center Foundation and TVEL Fuel Company.

Unique competencies

Rosatom is a state-run high-tech company that has often been praised by the national government for its achievements. Today, the company is an undisputed leader in global nuclear construction. Alongside construction, Rosatom companies have competencies in non-nuclear and non-energy areas. Their versatile product portfolio comprises nuclear medicine solutions and radiation uses in agriculture, sterilization of surgical instruments, water treatment and desalination, as well as additive manufacturing, green energy technologies, IT, petrochemical equipment and services, security systems, composite materials, small-sized hydro plants, and many more.

Rosatom's another product, which is worth special attention, is nuclear science and technology centers built around research reactors. Such centers now attract particular interest from emerging nuclear countries. They will be built in Bolivia, Zambia and Vietnam.

Over many years of Russia's nuclear industry development, its companies have acquired great expertise enabling them to come up with their own products for key national industries, be it power generation, petrochemistry, metallurgy or defense. This is best exemplified by AtomEnergMash (AEM), Rosatom's mechanical engineering division. Not long ago, AEM's Hungarian subsidiary Ganz EEM signed its first contract for the supply of small containerized hydropower plants to Georgia. Each HPP

consists of a turbine and a set of auxiliary equipment mounted inside a container. Small HPPs boast low generation costs, delivery short time, fast and easy installation. They can serve either as independent sources of power or an alternative to cost-inefficient and non-eco-friendly generators.

AEM also offers proprietary water treatment and desalination solutions for industrial, agricultural and public purposes.

Nuclear medicine is a stand-alone business area for Rosatom. Companies of the Russian nuclear group manufacture a range of medical equipment and isotopes. Not long ago, Rosatom set up the production of molybdenum-99, an isotope that is widely used in cancer treatment. Russian-made medical isotopes are now supplied to other countries. Rosatom has also established a new division – Rusatom Healthcare – to foster the development of nuclear medicine. It is also set to promote radiation technology systems designed for irradiation and sterilization centers.

These are only a few examples of how Rosatom develops its new businesses and products. Another direction Rosatom is heading for is the wind power market. Last year, the company won a contract for the construction of three wind parks in Southern Russia, with investments totaling 1 billion Euros.

IN BRIEF

Pre-Operational Flushing Started at Belarus Unit 1

Pre-Operational Flushing Started at Belarus Unit 1 to pre-wash active and passive safety systems and piping. This is one of the most important operations as it clears the way to the next round of tests

on the first circuit of the nuclear reactor. “By flushing systems and pipes of the first circuit with demineralized water, we check that there are no obstacles or debris inside,” explained Maxim Bogachko, Deputy Director for Heating and Installation at ASE. “In fact, we began preparations for pressure tests and circulation flushing of the reactor’s first circuit.” Pre-Operational Flushing follows an approved time schedule and cover 26 different systems. Constructed near the Belarusian town of Ostrovets (Astravets),

the Belarus Nuclear Power Plant will have two VVER-1200 reactors with a total capacity of 2,400 MW. The plant is based on the same design that is used for Novovoronezh II and Leningrad II. Unit 1 of Novovoronezh II has been put in operation and serves as a reference project for the Belarusian plant. VVER-1200 is an evolution of Generation III reactors and is fully compliant with international safety standards/