Belarus NPP: All Safety Threats Addressed

Belarusian authorities factored in all possible external hazards to the local nuclear plant constructed by Russia. This was announced by Grzegorz Rzentkowski from the IAEA Department of Nuclear Safety and Security after the SEED mission to Belarus.

The SEED (Sight and External Events Design) mission was yet another milestone in the long-term partnership between Belarus and the IAEA. All IAEA missions are sent at the invitation of the country hosting a nuclear site to obtain expert advice and support. Belarus came forward with this initiative in 2014, and its move was appreciated by the neighboring Lithuania.

The mission to Belarus spanned five days, from 16 till 20 January, as IAEA experts assessed the plant site near the Belarusian town of Ostrovets (Astravyets) for compliance with international safety requirements, as well as resistance of the plant's structures and systems to external and internal hazards. They also evaluated the structures' safety margins designed to account for the post-Fukushima requirements. The IAEA mission included leading international experts from the USA, Poland, France, Hungary, Turkey and Romania.

"As part of the mission's assignment, we concluded that the Belarusian authorities duly accounted for all potential external hazards in the nuclear power plant design," said Grzegorz Rzentkowski. According to him, the SEED mission will provide the Belarusian government with a final report on the mission's results within 90 days after its completion. The report will be made available to general audience.

"We have concluded that the design of the Belarusian nuclear plant accounts for all external factors and safety issues. All the required measures have been taken to prevent the worst scenario from happening. We have also discussed safety lessons learned from Fukushima. Welcoming approach and openness on the Belarusian part facilitated the success of our mission," added Grzegorz Rzentkowski. He also noted that Belarus followed positive practices in the nuclear construction project. Most notably, local experts perform regular screening of external threats selected with reasonable criteria. It is the nuclear operator's duty to provide the regulator with comprehensive safety and other data.

Cooperation with IAEA gathers pace

Belarus plans to invite at least one more IAEA mission, this time to review the emergency preparedness and response framework, by the end of this year. The country has also invited the Pre-Operational Safety Review Team (Pre-OSART) mission to take place closer to the plant's commissioning date. The work is ongoing to prepare for the Phase III Integrated Nuclear Infrastructure Review (INIR-III) mission that will visit Belarus when its first nuclear power plant is about to be put in operation. Belarus demonstrates openness
The Belarusian nuclear power plant is widely discussed in Lithuania. As Iya Malkina, First Deputy Minister of Natural Resources and Environmental Protection of Belarus, says, Belarus demonstrates openness and expends much effort in improving the dialog with Lithuania. The parties held two rounds of bilateral consultations in July and September 2016 to discuss technical aspects of the nuclear plant project. On 23 December, the Belarusian Ministry of Natural Resources sent the Lithuanian Ministry of Environment an invitation to continue the dialog on the expert level. Besides, Belarus is prepared to discuss, among other things, the establishment of a joint body to consider environmental and radiation safety issues, a joint radiation monitoring system to be installed on the both sides of the border, and a joint group for post-project analysis of the Belarusian nuclear plant. Belarus is also ready to move forward with a bilateral agreement on implementation of the Espoo Convention.

Vladimir Potupchik
Minister of Energy of the Republic of Belarus
"Belarus has made a firm decision to develop its national nuclear industry and build a nuclear plant in full compliance with its international commitments. Work is now in full swing on the construction site. I would like to stress that it is carried out in accordance with the IAEA standards and with the help of the Agency's consultants and experts.".

FOR REFERENCE:
The Belarusian nuclear power plant is built by Russia near the town of Ostrovets (Astravyets), approximately 50 kilometers from Vilnius, the capital of Lithuania. The first reactor is scheduled to be brought online in 2019, followed by the second reactor in 2020. As announced earlier by Vadim Zakrevsky, Deputy Energy Minister of Belarus, the share of natural gas in heat and power generation will shrink to 70% after the nuclear plant is connected to the grid. According to him, the commissioning of a nuclear power plant is provided for in the national energy development program for 2016–2020. The plans are to decommission up to 400 MW of inefficient capacity and replace it with new, more efficient power stations. Fuel savings are expected to reach 850–1,000 tons of equivalent fuel. The nuclear power plant and power generation facilities fired with local fuels are planned to cut the consumption of natural gas by 2.5 billion cubic meters and reduce its dominant share in heat and power generation from the current 90% to 70%..

INTERVIEW

Pyotr Lavrenyuk: We Have a Difficult Exam Ahead

TVEL Senior Vice President for R&D, Technology and Quality speaks about TVS-K fuel and its promotion on the international market.

— When and how did the idea come up to manufacture TVS-K fuel?

— In the early 2000s, we came to an understanding that many Western nuclear operators were looking for new suppliers of nuclear fuel in addition to Westinghouse and Areva. Evgeny Adamov, the then head of the Russian nuclear industry, gave TVEL a task to consider a possibility of entering the Western fuel market. And yes, there were those who were skeptical about the feasibility and prospects of the project; there were financial difficulties, but they did not stop us.

— What companies were involved in the development of the new fuel?

— The TVS-K fuel development project was coordinated by OKBM Afrikantov. Materials and design were developed by Bochvar Russian Research Institute of Inorganic Materials. Leipunsky Institute and Kurchatov Institute were also involved in the project. An important role in testing fuel designs was played by Novosibirsk Chemical Concentrate Plant. Some ideas about the guide rod technology were proposed by Chepetsk Mechanical Plant.

— How difficult was it to develop such fuel in technical terms?

— We had all the research, design and production capacities required to start the project. But true, it was difficult because our fuel had to be compatible with that used in Western-designed reactors. We did not have enough information to quickly produce a fuel assembly like that, so it took us some time. We completed all the calculations, testbed experiments and in-pile studies of different fuel components by 2007 and came to the conclusion that we were capable of offering the market a new product. In 2008, we began working in close contact with Swedish company Vattenfall that provided us with data needed to finalize the project. It took TVEL two years to have been qualified as a fuel supplier. In 2011, our Swedish partners made sure that our product met their requirements and decided to work with us.

— Was it difficult to reach an agreement?

— I would not say it was very much difficult. We had a clear understanding of our capabilities and the customer's requirements, so it was not a problem to make an agreement. In 2011, we signed a contract to produce pilot fuel assemblies. From the very beginning, we set ourselves a task to make no mistake. We were told that we should make a fuel to be used at uptated power. When the talks reached a point of discussing commercial supplies, it meant that the fuel met the customer's

requirements. Our initial design underwent minor changes only.

— The contract for commercial supplies of TVS-K fuel was a 2016 milestone for Rosatom. Was it easy to sign the contract?

— It was an idea of the Swedish customer to sign this contract. It should be noted that this is a 'deferred decision' contract. Deliveries will begin in 2021.

— What are the advantages of TVS-K over Western fuel?

— Our fuel differs from the fuel of Westinghouse or Areva in a number of parameters, including structural materials, spacer grids and manufacturing technology. We strive to make a fuel that will be trouble-free for the operators in terms of control. We managed to design fuel elements that do not change their geometrical shape after five years in operation in very tough conditions. When designing TVS-K, we relied on our expertise in producing nuclear fuel for VVER reactors. Fuel burnup is another important parameter. We have reached a burnup of 60 MWd/kgU while maintaining safe and reliable operation of the fuel assembly.

— What is the progress in promoting TVS-K fuel on the American market?

— The process is underway without fail, but it is strictly regulated. It is not a task of TVEL as Rosatom's fuel division alone. It is a task of Rosatom. Test operation requires delivery of four to eight fuel assemblies. If our plans are fulfilled, production of TVS-K will be organized in the USA.

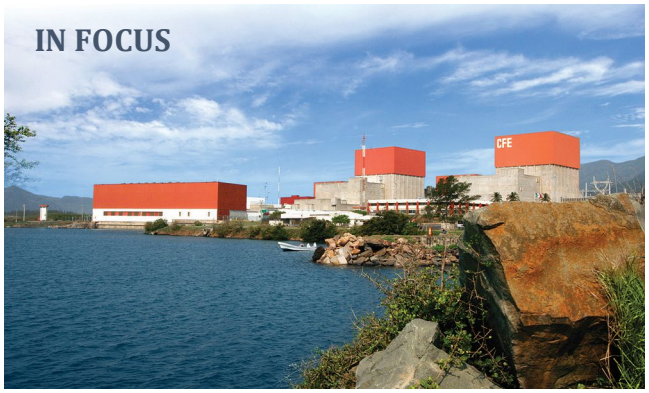
— Why did you make this decision? Do Americans have capacity to fabricate this fuel?

— This decision was made for the reason of logistics. The U.S. nuclear industry is a well-oiled mechanism. No stock is kept at the plant. To supply fuel from Russia means to ship it across the ocean. This is too long. And there should be no failures. This is why we had discussed the possibility of organizing fuel production in the USA from the very beginning. More important is to decide whose uranium to use. We will insist on using our uranium.

— Have you assessed the market for TVS-K fuel?

— The market assessment has been carried out, and goals are set. The main thing is to achieve these goals. We do not want to limit fuel supplies to two or three reactors. I would like to stress it once again that we plan to supply TVS-K fuel on a commercial scale. Rosatom has set an ambitious promotion goal with regard to TVS-K fuel. Apart from business, there is politics, and our task is to convince customers that the product we offer is reliable and has excellent performance characteristics and a competitive price. The market is vast, but we understand that no one will give up its market position. Most of the target reactors are located in the USA. Entering the American nuclear fuel market is a new and difficult task. This is the reason why we have made a partnership with Global Nuclear Fuel Americas, a heavyweight player of this market. Many operators from all over the world will be more willing to work with us after we are licensed in the USA. In other words, we have a very difficult exam ahead, but I am sure we will pass it.

IN FOCUS



Mexico Prepares to Tender Out Nuclear Plant Project

Mexico has started preparing to tender out a major project to construct two nuclear reactors in the country, says César Hernández Ochoa from the Mexican Ministry of Energy (SENER).

"The Federal Electricity Commission of Mexico (CFE) has entered the initial project phase. It is carrying out surveys and drafting technical documents to be used in the request for proposals to build two new reactors at Laguna Verde Nuclear Power Plant," said the Mexican official at Mexico Energy Forum 2017.

Nuclear power generation was the only segment not affected by the energy reform proposed by the administration of President Enrique Peña Nieto in 2013, and its development was postponed. This segment is regulated by the Nuclear Energy Department subordinate to Jaime Francisco Hernández, CFE Director General. According to the plans of SENER, the construction of two new reactors will start after 2028, and government investments in the nuclear segment will be revised. According to the government official, SENER will also study whether this type of clean energy will remain competitive over the next 15 years. The decision to start the bidding process for private companies will be made by the country's next government to be appointed after the 2018 presidential election, he said.

Rosatom monitoring the situation

"Rosatom's representatives have had a series of meetings with Mexican officials, including a meeting at Atomexpo 2016, to demonstrate advantages of our nuclear construction technology. We are monitoring the situation closely," Ivan Dybov, Director of Rosatom America Latina, commented on the words of César Hernández Ochoa.

Nuclear energy in Mexico

The country currently operates two power reactors accounting for 4% of electric power generated in Mexico. The first reactor at Laguna Verde Nuclear Power Plant was put in operation in 1989, with its service life expiring in 2029. The plant's second reactor was commissioned in 1994 and will be operated till 2034. Each of the reactors is of BWR type and has a capacity of 654 MWe.

According to the World Nuclear Association, the story of nuclear development started in 1956 with the establishment of the National Commission for Nuclear Energy (CNEN). That organization took general responsibility for all nuclear activities in the country except the use of radioisotopes and the generation of electric power. CFE, one of the two state-owned electricity companies, was assigned the role of future nuclear generator. The government supports the expansion of nuclear energy, primarily to reduce dependence on natural gas, but also to cut carbon emissions.

In November 2010, CFE was talking about building six to eight 1,400 MWe units, the first two at Laguna Verde. With the release of the 2012 energy policy, the

government urged looking beyond low gas prices to consider building two more reactors at Laguna Verde or elsewhere in the state of Veracruz, as a first step in expanding nuclear capacity by 2026. This call was repeated in mid-2014. In mid-2015, the Development Program of the National Electric System included plans to commission new capacity, including three nuclear power plants, with a tentative schedule to enter commercial operation by 2026, 2027 and 2028.

Last year SENER published an updated analytical report on the prospects of electric power generation for 2015–2029. The report considers a possibility of using small modular reactors to generate heat and power in the Mexican state of Baja California. According to experts, a small modular reactor with a capacity of up to 100 MW "can be a more cost efficient solution than a co-generation plant."

IN BRIEF

Foreign Experts to Assess Readiness of Rostov Unit 4

A multi-national team of nuclear experts will assess start-up readiness of Rostov NPP Unit 4.

In the autumn of 2017, nuclear plant employees from all across the globe will come to inspect the fourth unit of Rostov nuclear power plant and check whether it is ready to go critical. The new reactor is designed to make Southern Russia, including Crimea, energy secure, NPP Director Andrei Sidelnikov told the media. "There will be 25–30 experts from different countries to come and check the startup readiness of Unit 4. They will be nuclear power plant employees from the USA, UK, Iran, France, Czech Republic, Slovakia, Ukraine and so on," Sidelnikov explained. According to Pavel Tikhonov, a foreman at Rostov-4, fuel loading is scheduled for the autumn of 2017. The work is underway to complete the installation of the plant's safety systems and check their operation.

Keel of Leader Nuclear Icebreaker to Be Laid in 2019

The keel of Russia's new nuclear icebreaker Leader will be laid in 2019, Vitaly Torbik from United Shipbuilding Corporation (USC) said on Tuesday.

The Leader icebreaker will enable the all year round navigation along the Northern Sea Route and in the high latitudes in general, thus strengthening Russia's presence in the Arctic region. More than 200 meters long and about 50 meters wide, the icebreaker will have a capacity of 120 megawatts and will be capable of breaking 4 meter thick ice. The vessel will convoy 100-ton deadweight ships with a body width of 44–50 meters from Cape Zhelaniya to the Bering Strait with a speed of up to 10 knots.