



Future Belongs to Fast Reactors

This week, Yekaterinburg hosted the International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17). You will find more details on the event in our report.

The conference was held by the International Atomic Energy Agency (IAEA) and the Russian government in cooperation with Rosatom. With over 500 reports from more than 30 countries, FR17 had grown into the world's largest conference devoted to fast neutron reactors. The conference was attended by around 700 industry experts. The event was aimed at providing a platform for exchange of experience and information about programs, whether local or international, and new developments in

the field of fast reactors and related fuel cycle technologies.

Fast neutron reactors offer great advantages for development of nuclear industry. Based on the closed nuclear fuel cycle technologies, such reactors reproduce (or breed) fuel, thus increasing the fuel stock in the industry and minimizing radioactive waste by 'burning up' hazardous radionuclides. Russia is a global leader in fast breeder technologies.

Rosatom CEO Alexei Likhachev said in his opening speech that fast neutron reactors now developed worldwide will facilitate the transformation of nuclear power into a truly renewable and safe source of energy. "The future of the world's nuclear power industry is inextricably linked with the development of closed nuclear fuel cycles, in which fast reactor technologies play a key role. So, in the years ahead, the world's nuclear energy will be truly renewable due to recycling of fissile materials," said Alexei Likhachev. According to him, it is no coincidence that this conference – the largest one ever held

on the subject – is hosted by Russia. "It is widely known that Rosatom is one of the global leaders in fast neutron technologies," Rosatom CEO added.

Memorandum with V4G4

The number of MBIR participants has increased. At the FR17 Conference, Rosatom signed a memorandum with the V4G4 Center of Excellence. V4G4 was established by four nuclear research institutions and engineering companies of the Visegrad Group countries – the Czech Republic, Slovakia, Hungary and Poland. Now, these countries can take part in MBIR project.

The memorandum was signed by Vyacheslav Pershukov, Rosatom Deputy CEO for Innovation Management, and János Gadó, Head of the V4G4 Steering Committee. The partners agreed to negotiate the key terms of participation in the MBIR-based international research center and estimate the reactor capacity required to complete the research program.

Experts' visit to Beloyarsk Nuclear Station

The participants of the FR17 conference made a technical tour round the Beloyarsk Nuclear Station, which operates the BN-600 and BN-800 fast reactors. According to William Magwood, Director General of the Organization for Economic Cooperation and Development Nuclear Energy Agency (OECD NEA), the unique experience of the Beloyarsk Nuclear Station will help other countries gain a better understanding of fast reactor specifics. "This is the first time in history when two fast-neutron reactors are being operated simultaneously. While designing the BN-800 reactor, you made a very good use of the multi-year BN-600 operation experience. I think that these fast-neutron reactors open the door to a thousand-year era of clean energy. BN reactors allow for disposing hazardous radioactive waste and thus improving safety of the nuclear industry. If such technology is developed internationally, the world will become a safer and cleaner place. I also think that, in 50 years, the mankind will refer to the Beloyarsk Nuclear Station as a pioneer in this field," said Mr. Magwood.

EDUCATION

It Is All About Workforce

Rosatom is committed to promoting nuclear education. At the ATOMEXPO 2017 forum held last week in Moscow, Rosatom Group companies signed a set of agreements related to education and training of workforce for national nuclear industries. You will find more details in our report.

Rosatom International Network (RIN) signed two documents providing for cooperation with educational institutions.



The first document, a memorandum of understanding, was signed with Hungary's University of Debrecen. It provides for cooperation between the parties in joint research and educational efforts, including lectures, bilateral

seminars, publication of learning aids, implementation of student exchange programs with Russia's engineering universities. "Rosatom is historically committed to promoting cooperation in research and education. I am especially pleased to see one of Hungary's leading universities join the list of our partners," noted Alexander Merten, President of Rosatom International Network.

The parties also agreed to consider the possibility of establishing a department to train nuclear industry professionals at the University of Debrecen. "The cooperation between the University of Debrecen and Rosatom is extremely important for Hungary and the university itself. Both the company and the university can greatly increase their competitiveness by putting together their earlier developments (including those related to fabrication of medical isotopes and isotope carriers)," noted Zoltán Szilvássy, rector of the University of Debrecen.

Cooperation with SPbU

RIN will also join efforts with Saint Petersburg University (SPbU) in promoting public acceptance of nuclear energy outside Russia. Their activities will be aimed at telling the target audience about the benefits of Russia's nuclear technologies, facilitating the promotion of Rosatom's products and services, and representing the Russian school of education and research. As part of such joint activities, the parties intend to organize humanitarian, cultural and environmental projects and events, and international conferences both in and outside Russia. The representatives of SPbU's academic community will be engaged as lecturers at foreign universities, take part in preparing training aids on nuclear engineering for foreign colleges and universities.

Cooperation with Bolivia gathers pace

Another important document was the memorandum signed by Rosatom América Latina and the Higher University of San Andres (also known by its Spanish acronym UMSA). "This document enables us to take part in such cooperation efforts as staff exchange, development and implementation of joint projects related to public acceptance and human resources, the award of special scholarships to students, bilateral seminars, joint preparation of learning aids and so on," said UMSA rector Dr. Waldo Albarracín.

Education is a key to public acceptance, said Ivan Dybov, Director of Rosatom América Latina. "In terms of public acceptance, there is no better alternative than education. That is why Rosatom gives special focus to this area. The signing of this memorandum with UMSA – our second memorandum with a Bolivian university – will not only benefit the quality of research and education at the country's major university, but also help raise the public awareness of nuclear technologies and its benefits for Bolivia's people," he noted.

As Bolivia evolves the non-energy areas of its nuclear industry, the signing of the document opens up diverse opportunities for the Bolivian students to gain extensive expertise in the non-energy areas of civil nuclear and access the benefits of modern nuclear technologies for Bolivia's agriculture, medicine, industry etc.

Other Agreements

The Paris Institute of Technology (officially Ecole Nationale Supérieure de Techniques Avancées ParisTech, or ENSTA ParisTech) and the National Research University (MEPhI) agreed to expand its research cooperation and

academic exchange, and run joint research programs, seminars etc. Similar arrangements were made with France's Institute for Nuclear Science and Technology (INSTN), which also signed

such agreement on cooperation in education and staff training. The first joint project of such kind will be the French-Russian research paper contest for students

TECHNOLOGY

One More Step to Wind Power

O TEK (a Rosatom company) and Lagerwey agreed on the transfer of the Dutch technology for manufacture of wind generators.

The agreement was signed at ATOMEXPO 2017 by Lagerwey CEO Huib Morelisse and Emin Askerov, OTEK's Deputy CEO for International Business. The document provides for creation of a modern wind power industry in Russia. The parties are strongly committed to delivering OTEK's wind power program, which includes involvement of local suppliers in production of over 65% of hardware for Russia's wind turbine industry. Lagerwey's unique offer enables OTEK to set up the local production of almost all turbine components in Russia. Besides, Lagerwey authorized OTEK to market and sell the Russian-made turbines in Russia and the adjacent countries. The license agreement between OTEK and Lagerwey is the first major step in implementation of the memorandum of understanding signed by the parties in January 2017. The next step is to establish a joint venture in the summer of 2017.

"We are proud to be a Dutch company that supports Russia's ambition to create its national wind power industry. As a technology partner of OTEK, we provide innovative designs, better hardware logistics for Russia and the expertise needed to establish a wind power industry," said Huib Morelisse, CEO of Lagerwey.



"Rosatom is consistent in its strategy to establish a new wind power industry in Russia. Now that this important agreement is signed, we can start a full-fledged transfer of wind turbine manufacturing technologies to engage local manufacturers in our program. It should be noted that we are not just going to build 970 MW of wind farms in Russia, but also intend to produce innovative and fully marketable wind turbines. This is a part of our strategy of winning new markets with modern hi-tech products," said Kirill Komarov, Rosatom's Deputy CEO for Corporate Development and International Business.

Rosatom has reasonable grounds for entering the wind power industry. The company has all necessary competencies and capacities for setting up local production of wind generators. Rosatom's Atomash based in Volgograd, Russia, will be the main production site as it has necessary infrastructure, including industrial premises, storage sites and a river pier. Another advantage of the plant is its relative proximity to the sites in Southern Russia selected for the wind farms. In 2016, Rosatom won the contract to construct three wind farms with a total capacity of 610 MW in Russia. This is

about 17% of the total wind power capacity to be commissioned in the country by 2024.

WIND POWER INVESTMENTS

Gazprombank has signed an agreement with Rosatom to provide a loan for the construction of wind parks. Gazprombank and VetroOGK (a subsidiary of Rosatom),

have signed the first agreement on financing Rosatom's wind energy construction project. Under the loan agreement, the project will receive 63.1 billion rubles of investments over the next 10 years. The loan provided to VetroOGK is to be repaid from the cash flow generated under renewable energy supply contracts made by VetroOGK.



No Borders for Nuclear Safety

The first batch of spent nuclear fuel (SNF) has been dispatched from the repository at Andreev Bay (Murmansk Region).

This landmark event took place in late June in the Murmansk Region. The first batch of SNF was sent on board the Rossita container ship for reprocessing. The vessel is meant for transportation of the spent nuclear fuel and internals of decommissioned nuclear submarines from the Russian Navy coastal bases in North-West Russia. The ship was built by

the Fincantieri company at the Muggiano Shipyard in La Spezia, Italy. The construction was financed by Italy's Ministry of Economic Development under the Russian-Italian intergovernmental agreement on disposal of decommissioned Russian nuclear submarines and safe management of radioactive waste and spent nuclear fuel.

The transportation of the first batch of SNF is a remarkable event, which exemplifies successful international cooperation in solving the complex problem of 'nuclear legacy' left in North-West Russia, raising nuclear and radiation safety, and improving the environmental situation. "There are no borders for

nuclear and radiation safety,” said Rosatom CEO Alexei Likhachev. “Our foreign partners share this idea.” RosRAO and Rosatomflot are starting the key stage of the operations at Andreev Bay. Rosatomflot’s Rossita will carry the first flasks with spent nuclear fuel to the Mayak reprocessing facility.

The SNF and RAW management facilities and the engineering infrastructure were constructed under the sponsorship of the Industrial Decommissioning of Weapons and Military Equipment 2011–2020 federal target program and in cooperation with the governments of the UK, Norway, Sweden, Italy, the European Commission and the NDEP Support Fund (with the EU, Belgium, the UK, Germany, Denmark, Canada, the Netherlands, Norway, Russia, Finland, France and Sweden as stakeholders, and the European Bank for Reconstruction and Development as the trustee of the fund). Since 1999, more than 8 billion rubles have been invested in creation of infrastructure and improvement of the radiation situation at Andreev Bay. For this period, Russia has demolished 20 old facilities, built 17 new ones with the area totaling 18,889 sq m,

deactivated at least 12,000 cub m of RAW, and constructed 11 facilities for biological protection and SNF transportation and management. This result was achieved by signing 121 international contracts, carrying out about 45 surveys and developing new technologies for safety improvement. The resulting waste management infrastructure will make for more than a threefold reduction in SNF removal times.

According to Anatoly Grigoriev, manager of the international remediation project at Rosatom, unique technologies were developed and tested for this effort. “The project involved the leading researchers from such countries as the UK, France, Germany and Japan, who worked together to solve complex problems,” he noted. Mr. Grigoriev said the safe nuclear fuel storage, handling and reprocessing methods developed for the facilities at Andreev Bay can further be replicated worldwide, particularly for mothballing nuclear plants, disposing their waste materials and removing accumulated nuclear waste, especially in the Arctic areas.

IN BRIEF

Rosatom to Cooperate with NEA

Rosatom signed an agreement with the Nuclear Energy Agency (NEA) acting as a part of the Organization for Economic Cooperation and Development (OECD). The document provides for the agency’s files to be translated into Russian and published. The agreement is aimed at promoting exchange of expertise by publishing Russian-language versions of the NEA’s materials. The document presents Russia’s nuclear organizations with permanent access to the agency’s analytics. The initiative is meant both to

provide the Russian nuclear companies with information on the NEA’s activities and ensure the agency’s access to the Russian expertise.

TVS-K Pilot Batch to Be Delivered to USA in 2019

In 2019, Rosatom’s TVEL Fuel Company plans to supply the TVS-K nuclear fuel to a nuclear power plant in the USA for pilot use, said Oleg Grigoriev, TVEL Senior Vice President, at the ATOMEXPO 2017 forum in Moscow.

“We have already signed a contract for pilot use of the fuel with a US operator and will deliver the pilot TVS-K assemblies in 2019,” Mr. Grigoriev said. He added that the fabrication of the pilot batch would start in 2018.

Rosatom and Areva to Improve Cooperation

On the margins of the 9th Atomexpo 2017 International Forum, Rosatom and France's AREVA NP signed a memorandum of understanding.

The document was signed by Rosatom CEO Alexey Likhachev, on the Russian

part, and Bernard Fontana, CEO of AREVA NP, on the French part. The parties also signed a cooperation program, which specifies the key areas of mutual interest. These documents are aimed at expanding the long-term cooperation between Rosatom and AREVA NP in the field of fuel fabrication, automated process control systems, and maintenance of nuclear plant equipment. The signing of the memorandum is meant to demonstrate the commitment of both companies to cooperation.

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