



## Efficient Maintenance

**Maintenance is one of Rosatom's fastest growing businesses at the moment. Rusatom Service is active in 10 countries, providing maintenance services at 22 operating VVER-based power units and eight reactors under construction. Evgeny Salkov, CEO of the company, told Rosatom Newsletter about their current projects and plans for the future.**

- What is the role of Rusatom Service as a maintenance service integrator? What results did you achieve in 2016?**
- Our company was founded in 2011 as a business unit to develop corporate competencies in managing maintenance projects. Our task was to earn the largest possible share in the maintenance market and win foreign contracts. Rusatom Service is now active in 10 countries,

providing maintenance services at 22 operating VVER-based power units and 8 reactors under construction. We deliver different complexity projects in Iran, Bulgaria, China, Hungary, Slovakia and Armenia. In 2016, our revenue from foreign contracts grew 33% year-on-year to reach 71 million US dollars, while the total contract portfolio amounted to 422 million US dollars.

- Much attention overseas is given to nuclear plant maintenance. Rosatom is marketing it as a 'new product'. What are the company's current prospects on the global market?**
- The maintenance market is very much volatile and dependent on customer needs. If we take such segments as maintenance and repairs, retrofit, life extension, supplies, operational support and nuclear infrastructure, their size is around 1 billion US dollars per annum combined. I am only speaking about Russian-designed VVER-based stations abroad. Our service offering is limited at the moment, but we see good prospects both in the nuclear industry and other

energy sectors (including green energy). It all depends on how our new products will fit into the global market and how competitive and flexible our company will be.

**– What are your key projects, whether completed, in progress or just planned?**

– First, these are life extension projects, particularly those carried out at the Armenian Nuclear Power Plant and Units 5 and 6 at Kozloduy in Bulgaria. These large-scale projects involving a great deal of workforce take several years and require total concentration. Another type of projects is maintenance and repair. Much work of this kind is done at Bushehr NPP in Iran. Earlier this year we fulfilled our four-year contract, having completed the third planned-and-preventive maintenance. We are now drafting a direct contract for spare part supplies, maintenance and repair, and staff training at Bushehr.

**– In September 2014, Russia signed a contract for a feasibility study to extend the service life of Kozloduy Unit 5 up to 60 years. The contract was to be performed within a fantastic period of only 27 months. A similar procedure in Russia would have required far more time. How did you manage to squeeze everything into such a short period of time?**

– The work was done by a tightly-knit international team of experts from 16 EU-based organizations in the spirit of trust, mutual understanding and cooperation, with 3 working languages used. Efficient and flexible project management, proactive approach to problem solving, result-driven attitude and openness to dialog produced a synergistic effect that helped us deliver the project two times faster than it was scheduled (2 years vs.

4–5 years). Once the project was completed, we were pleased to receive a positive feedback from the customer, Bulgaria's Ministry of Energy, and our French partners Electricite de France and Assystem. At present, we are doing a similar job at Unit 6 under the contract signed on 28 January 2016.

**– In late June 2016, Škoda JS and Rusatom Service signed a contract for technical support during the primary loop installation and pre-commissioning activities at Mochovce Units 3 and 4. Why is this project important?**

– This is our first major project with Škoda JS. We are sure that it will be productive and facilitate further cooperation between our companies. The project is very important for us. Despite being rivals on the Central and Eastern European market, our companies have managed to find common grounds, agree on cooperation, and now expect to broaden their joint efforts in other countries.

**– There were reports last October that Rusatom Service was considering the possibility of acquiring assets in Western and Eastern Europe. This would allow the company to enter the foreign reactor maintenance market. Are these plans still relevant?**

– We are exploring the possibility of acquiring assets in Europe. Our strategy provides for the establishment of subsidiaries or joint ventures in countries that already have large VVER maintenance markets or intend to build large capacity nuclear plants. M&A activities in Europe are aimed at securing our position on the regional market and winning local resources (experts with international qualifications).



## Next Step to Success

**Rusatom International Network held a seminar dedicated to modern nuclear technologies and its applications, in Asunción (Paraguay). The seminar attracted more than 110 attendees.**

The workshop was initiated by the Paraguayan side and supported by the Russian Embassy in Republic of Paraguay, the National University Asuncion (UNA) and the Radiologic and Nuclear Regulatory Agency (ARRN). The seminar took place in the National University of Asuncion (UNA), with participation of the deans of the Quimistry Sciences and Natural and Exact Sciences faculties, within the framework of a Memorandum of Understanding signed between ROSATOM and ARRN on the peaceful use of atomic energy, signed in October 2016. Workshop brought together Russian and national experts on a public debate focused on non-energy means and

benefits that nuclear technologies brings to medicine, industry, agriculture and many others. The seminar attracted more than 110 attendees.

The Economic Adviser of the Embassy of Russian Federation in the Republic of Paraguay, Igor Varlamov, opened the event with the greeting words. In his speech, the Vice Consul positively estimated and expressed confidence in the progress of this ongoing cooperation on the peaceful uses of atomic energy. "I believe that cooperation in nuclear sphere established by the MoU signed last year is very fruitful for both and this seminar is next step to success", he stated.

From Paraguayan side, opening remarks were delivered by representatives of the main nuclear institutions of the country, including Gustavo Casal, from the Ministry of Energy and Mines, and the Executive-Secretary Minister of ARRN, César José Cardozo Román.

In his speech, the Minister Cardozo Román expressed his gratitude to the organizers and all attendees, many of

them students from UNA, besides offering a brief nuclear background, as well as brief panorama on the current situation of Paraguayan nuclear industry. He highlighted that application of nuclear technologies in medicine and agricultural business becomes highly required.

"Nowadays we depend on our neighboring countries in radiotherapy diagnostics and treatment. The growing demand of such services cannot be fulfilled in Paraguay so we are very interested in modern solutions that nuclear technologies provide. As our country is one of the centers of tourism medicine, these solutions can increase variability of services we provide and even attract patients from other countries to get treatment here", he stated. Cardozo Román also noticed that Paraguay faces limitations in products exports thanks to the global exigency for safe products. "We have a great export potential of products derived from the agro, but today, we can't consider market of European countries or the United States, because following strict safety regulations they require irradiation to be executed before entering products. So the calling for applications of nuclear technologies is made by business reasons", he added.

Dr. Inocencia Peralta, President of the National Atomic Energy Commission of Paraguay (CNEA), presented a report on main characteristics of national atomic programme and perspectives in construction of new Nuclear Research and Technology Center (NRTC) in the country, which counts, since 2014, with an unique authority on the topic of ionizing radiations (ARRN), besides the country's demand for training, research and monitoring. "Despite the fact that the regulatory framework have allowed a significant development for the country in the nuclear sphere, there are still much to be developed, mainly in terms of technology incorporation, creation of a



**Ivan Dybov, President of Rosatom America Latina:**  
*"We are very pleased to see that the workshop brought together a lot of industry experts, students, managers of state-owned companies, and private businesses. The discussion was centered on the use of nuclear technologies in research, medicine and agriculture, with special attention paid to the national nuclear infrastructure development, staff training and improvement of public awareness. Paraguay is very much interested in the development of nuclear medicine, which is now available only abroad, for example, in Brazil. As an exporter of agricultural products, Paraguay is also interested in irradiation technologies essential for boosting exports, for instance, to Europe or the USA. At the seminar, Rosatom presented specific solutions in these fields. Its comprehensive approach was presented by RAOS, while the Research Institute of Applied Physics and Automation delivered informative reports. Rosatom's relations with Paraguay keep developing. We signed a memorandum of understanding last year and plan to arrive at new agreements in the near future".*

center of excellence in the country, personnel training, science and training centers distribution around the country", affirmed Dr. Peralta.

From ROSATOM's side, several presentations were made by representatives of leading companies in Russian nuclear industry such as Rosatom Overseas, Uranium One, Isotope, Rusatom International Network (including its LATAM office) and JSC "NIIFTA". Russian side presented Rosatom's large experience in application and development of radiation technologies and solutions in wide range of spheres. Among presentations there were reports on ROSATOM 's integrated offer for the

construction of NRTCs and approach on the creation and development of the nuclear energy infrastructure, the newest solutions used by ROSATOM in nuclear technologies in medicine and the wide range of products offered, construction of multi-functional facilities for radiation processing of food and medical products, from which the countries can experience economic benefits and improvement of the population's health, isotopes supply with application in industry and medicine, natural uranium production, radioactive waste and spent nuclear fuel management, decommissioning. In addition, they presented HR solution and solutions in ensuring public acceptance of nuclear technologies carried out by Rosatom and based on best international and its own expertise.

## FOR REFERENCE

On 18 October, 2016, the Radiological and Nuclear Regulatory Authority of Paraguay and ROSATOM signed a memorandum of understanding on cooperation in peaceful

uses of atomic energy. The document was signed by Eladio Loizaga, Minister of Foreign Affairs, from the Paraguayan side, and Nikolay Spassky, Deputy CEO of ROSATOM, from the Russian side. The signing ceremony was attended by Sergey Lavrov, Minister of Foreign Affairs of the Russian Federation. The Memorandum is the first document relating to peaceful uses of atomic energy that has been signed between the two countries. The document constitutes the basis for the bilateral cooperation between Paraguay and Russia in a number of areas including the application of radioisotopes and radiation technology in industry, medicine, agriculture, etc.; assistance in creation and development of the nuclear power infrastructure in Paraguay; nuclear and radiation safety, and security; development of programs aimed at raising the public awareness about nuclear technologies and their applications, including organization of corresponding information centers, etc.

## INTERVIEW

### Russia Can Support Paraguay in Nuclear Development

**Dr. Inocencia Peralta, President of the National Atomic Energy Commission of Paraguay (CNEA) told Rosatom Newsletter about her impressions of the workshop and shared her view on cooperation with Rosatom.**

**- Could you please share your impressions of the workshop? Were the Russian presentations helpful?**

- The workshop was extremely interesting in a number of ways. Never has our country seen so many different nuclear experts who made the conference interesting and understandable at every



level. I should be also noted that the audience was absolutely diverse – there were authorities, researchers, teachers, students and young professionals from different areas. The presentations were very useful and exciting. Many left the workshop with a completely different view on the use of nuclear technology.

## **- What do you think of the cooperation between Russia and Paraguay in the nuclear energy sector?**

- I believe that Russia can support the development of Paraguay and train human resources in the nuclear sector as human resources are key to the promotion and adoption of new technology. HR training and the possibility of technology transfer for the development of a nuclear research center are of great interest for the National University of Asunción and the country.

## **- How can nuclear technologies improve life in Paraguay?**

- Apart from exporting hydro power, Paraguay is mostly an agricultural exporter. We produce large volumes of meat, chicken, soy, maize, peanuts, and fruit, and have great potential for other products. It is this sector where food irradiation can make the difference in gain access to new markets or keep product costs low. In addition to safety and conservation of local produce, irradiation techniques are also useful for sterilizing drugs, tissues, prostheses, and medical instruments. Unfortunately, we do not have technology yet to be used in these sectors. It is also important to note that Paraguay needs broader use of

radiation for medical purposes because improving medical diagnostics and introducing radiation therapy are of vital importance for Paraguay.

## **- What is the public attitude towards nuclear energy and technologies in Paraguay?**

- If we consider workshop attendees, we can say that nuclear energy and technologies are totally accepted in Paraguay, but we must understand that it was in a university environment. In Paraguay, advantages and disadvantages of technology need to be disseminated. We also need to talk about risks and how these risks can be mitigated. We should also develop safety culture and radiation protection.

## **- Does Paraguay consider construction of a nuclear power plant in the future?**

- I cannot answer this question right now because Paraguay's current energy policy is based on the available energy mix. Paraguay has a surplus of hydro power and exports it to neighboring countries, but demand is increasing, so the country will inevitably have to generate more energy to cover its own demand, either by hydropower or by looking for alternatives.

## COOPERATION

### **Rosatom and IAEA to Improve Nuclear Infrastructure**

**The International Atomic Energy Agency (IAEA) and Rosatom will join efforts to improve nuclear infrastructure in emerging nuclear countries.**

The International Atomic Energy Agency (IAEA) and Rosatom agreed to cooperate in the improvement of the nuclear infrastructure in the countries that are



just taking the path of national nuclear power development. "This includes, in particular, nuclear trainings, development of the industry regulations, analysis of every safety facilities that is to be made

under the auspice of the IAEA,” said Alexei Likhachov, CEO of Rosatom. An agreement to this effect was signed by Yukiya Amano, IAEA Director General, and Alexei Likhachov. Russia will make a non-financial contribution to nuclear infrastructure improvement in emerging nuclear countries. The agreement was signed on 19 April, during the visit of Rosatom’s CEO to Vienna, and initiated from the Russian side. ‘We ensure succession with the aim to boost joint projects, we keep on increasing financing. Considering this, we take upon ourselves certain tasks while also determining these tasks for our cooperation with the IAEA. The point is to work actively in newcomer countries, those that join the nuclear power club’, noted Alexei Likhachov after signing the agreement.

## **Outcomes of the first meeting between the heads of the IAEA and Rosatom**

The first meeting of Amano and Likhachov took place on 19 April. Rosatom’s CEO said that the meeting was long though constructive. “The meeting



was rather long. We went through almost the whole agenda of cooperation between the IAEA and Rosatom. We also spent some time on sharing our ideas about the development prospects for both the global nuclear industry and particular energy sectors,” said Alexei Likhachov. Rosatom’s CEO mentioned that one of the issues discussed at the meeting was the importance of project evaluation from the point of view of its fair cost effectiveness and safety. He added that Mr Amano and representatives of the IAEA emphasized their interest in contracts with Rosatom as well as their willingness to develop cooperation in the human resources area.

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## **IN BRIEF**

### **Akkuyu Phase 1 Construction to Start This Year**

Construction of Phase 1 facilities at Akkuyu, Turkey’s first nuclear station to be built by Russia, is expected to begin this summer and will take almost two years.

Akkuyu Nükleer Güç Santrali A.Ş., a project company, placed an order to have engineering documents for foundation pits of Unit 1, Unit 2 and Phase 1 auxiliary facilities brought in line with Turkish laws. According to the statement of work, permits have to be obtained by July to begin earth moving (site grading and leveling), construction (formation of slopes at the nuclear plant site) and excavation of foundation pits for the reactor island at Units 1 and 2. The

foundation pits are expected to be ready by early January 2019. The company also plans to obtain permits by August to begin grading operations at the desalination plant site and construction of temporary structures at the nuclear plant site already this September. These operations are scheduled for completion in April 2019. The last part of the plan for the current year is to obtain a permit in late December to begin construction of catchwater drains and grading works at the site of a very low radioactive waste disposal facility in February 2018. These operations are expected to be completed by November and December of the next year respectively.

## **Sibir to Float Out in Early Autumn**

Sibir (Siberia), the second Project 22220 nuclear icebreaker, will be put afloat in early autumn, says a press release of the Baltic Plant.

This series of the world's most powerful nuclear icebreakers has been ordered by Rosatom's subsidiary Atomflot. The Arktika nuclear flagship was laid down in November 2013 and floated out on 16 June 2016. Construction of Sibir, the next vessel in the series, began on 25 May 2016, followed by the keel laying of another icebreaker – Ural – on 25 July 2016. Developed by Aisberg Design Bureau in 2009, Sibir's double draft design allows for navigating both in Arctic waters and estuaries of polar rivers.

## ***Project 22220 characteristics:***

***Length: 173.3 m***

***Width: 34 m***

***Capacity: 60 MW***

***Depth to upper deck amidships: 15.2 m***

***Designed draft: 10.5 m***

***Operating draft: 8.55 m***

***Tonnage: 33,540 t***

***Estimated service life: 40 years***

***Crew: 75 people***