

Nuclear safety cooperation between the European Union and the Republic of Belarus

Instrument for Nuclear Safety Cooperation (INSC)

The INSC is a funding instrument established and operated by the European Union, targeted at eligible third countries and supporting the promotion of a high level of nuclear safety, radiation protection, and the application of effective safeguards of nuclear material. The geographical scope of the INSC covers all third countries, but priority is given to accession and neighbouring states. In the current 7 years implementation period (2014-2020) the instrument disposes a financial budget amounting to €225 million.

One of the INSC focal areas is the cooperation with national nuclear regulatory authorities and their technical support organisations (TSOs) to enhance their regulatory skills by improving licensing and safety assessment capabilities. The level and technical areas of the regulatory cooperation with a specific country depends on the maturity and actual needs of the regulator, but the reinforcement of the nuclear safety infrastructure and the transfer of best EU practice and international experience are always priorities.

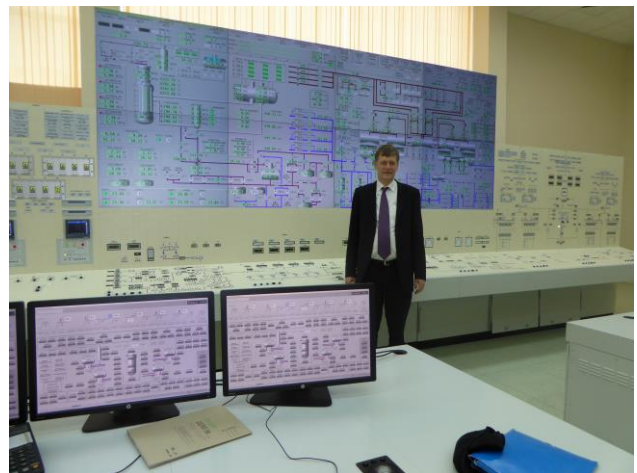
Nuclear Safety Cooperation with Belarus

In 2008 Belarus decided to embark on the construction of a nuclear power plant (NPP) with two units having a total generating capacity of 2000 MW electric. Later Ostrovets (located in the Grodno region, about 50 km from Vilnius, the capital of Lithuania) had been selected as the site for the Belarusian NPP (BelNPP). The design assessment process selected the AES-2006 design as favourite candidate for construction: the AES-2006 is a third generation Russian VVER reactor design with a capacity of 1200 MW electric. The construction of Unit 1 started in November 2013 and the first concrete for Unit 2 was poured in April 2014. Currently the anticipated dates for commercial operation are 2020 (Unit 1) and 2021 (Unit 2).

Starting from 1991 Belarus continuously received EU nuclear safety assistance in the frame of the TACIS project. After the decision to build the Belarusian NPP the cooperation was focused on topical areas related to the construction of a new NPP (e.g. reviewing licensing submittals, assessment of safety analysis reports, on-site and manufacturing inspections, commissioning, etc.) and the assistance was provided in the frame of the INSC instrument. The Beneficiary was the Ministry for Emergency Situations of Belarus (MES) and its department for nuclear and radiation safety, called Gosatomnadzor (GAN). The projects were implemented by consortiums led by RISKAUDIT and comprising nuclear regulators and TSOs from Bulgaria, France, Germany, Finland, Italy, Lithuania, Sweden and Ukraine.



EU and Belarusian experts visiting the site of the Belarusian NPP construction (2014) ©JRC



Getting acquainted with the full-scope simulator of the new plant (2016) ©JRC

Concluded and ongoing cooperation projects

Starting in 2013 three major ISNC cooperation projects were launched with Belarus: BY3.01/09 (BE/RA/07), BY3.01/13 (BE/RA/08) and BY3.01/16 (BE/RA/09). The first two projects had already been concluded, while BE/RA/09 is being currently implemented until early 2021.

These projects focused on the following main topical areas:

- Further development of Belarusian regulatory and legislative framework for nuclear safety and radioprotection
- Organisation and management system of the regulatory authority
- Establishment of an effective and independent Technical Support Organisation
- Regulatory assessment and review of nuclear safety documentation for licensing
- On-site inspections of safety relevant systems, structures and components during the construction process and during manufacturing at the equipment suppliers
- Use of computer codes applicable for supporting regulatory review activities
- Safe management of spent nuclear fuel and radioactive waste
- Enhancing emergency preparedness and response capabilities of the regulator
- Application of mobile equipment for environmental radiation monitoring

In the followings the technical contents of the above three projects are discussed in more detail.

BY3.01/09 – *Institutional and technical cooperation with GAN to develop its capabilities on the basis of transferred European safety principles and practices (2013-2017)*

The project consisted of two main components. Component A provided on-site assistance to the management of GAN in updating the Strategy and Action Plan of the Belarusian regulator; transferring EU Safety Assessment Report (SAR) review methodology and providing support in performing the actual SAR review.

Component B provided generic and plant-specific training to selected GAN and SOSNY experts on the use of the following EU codes: ATHLET (thermal-hydraulic calculations), COCOSYS (containment analysis), ASTEC (severe accident calculations) and DYN3D (dynamic modelling of reactor transients).

BY3.01/13 – *Support and assistance to strengthen the capabilities of the Belarusian nuclear regulatory authority MES/GAN in the field of licensing and supervision of construction of the Belarusian NPP (2015-2019)*

This project consisted of five main components. Component A was primarily aimed to continue the on-site support to the management of GAN focusing on such activities as improvement of the regulatory management system; provision of support in reviewing the SAR and other licensing documentation of the new plant; regulatory capacity building to review Probabilistic Safety Assessment (PSA) reports and supporting regulatory inspection activities.

Component B improved the Belarusian legislative, regulatory and organisational framework for the management of spent nuclear fuel and radioactive waste, including historical waste.

Component C provided training on accident analysis codes and delivered initial (basic) training courses for additional codes applicable to model NPP ventilation systems; to analyse criticality issues and reactivity-initiated accidents and to calculate the composition change of materials subjected to neutron irradiation.

In Component D an improved roadmap for emergency preparedness was developed for Belarus, also considering the new NPP under construction.

Component E provided staff training to use a mobile radiation laboratory which had been delivered in a separate project.

BY3.01/16 – Support and assistance to strengthen the capabilities of the Belarusian nuclear regulatory authority (2018 – ongoing)

This project consists of four main components. In Component A the on-site assistance is continued and it further develops the Strategy, Action and Cooperation Plan of MES/GAN, thus contributing to the enhancement of the capabilities of the Belarusian regulator. Component A also enhances the regulatory capacity to carry out independent nuclear safety assessments and licensing reviews and improves GAN's capabilities to carry out inspections on safety relevant systems, structures and components during the construction process of the new NPP.

Component B focuses on further enhancing the technical expertise capabilities of GAN by supporting the development of an effective and independent TSO system; supporting the review and assessment of safety documentation; improving expertise in deterministic safety analysis by providing further code training and developing a risk-informed regulatory approach. The code training is proposed to be continued by providing plant-specific training courses on ATHLET and COCOSYS to selected specialists of the CNRS, the newly created TSO of GAN.

Component C aims at further improving emergency preparedness and response capabilities in Belarus by supporting the establishment and development of the associated decision-making system; providing training to the experts working in the on-site and regional subdivisions of MES and providing support to improve emergency response measures and trans-boundary coordination of activities.

Component D helps to develop an improved strategy for the management of radioactive waste at the Belarusian NPP. It also aims to improve the regulatory supervision of radioactive waste and spent fuel management facilities, including their decommissioning phase.



Visit of a high-level EU delegation to the construction site (2016) ©JRC



Paying a short visit to the Information Centre of the new nuclear power plant (2016) ©JRC

Stress tests

The Republic of Belarus made a commitment after the Fukushima accident to perform the targeted safety reassessment (the so called "stress tests") of the new Belarusian NPP. The related safety analyses were carried out in 2016 according to the ENSREG-WENRA test specifications. The self-evaluation report was submitted by the BelNPP operating organisation to the nuclear regulator in 2017 and subsequently the Belarusian National Report was prepared and presented to the European Commission. The National Report underwent the usual peer review process performed by ENSREG with the peer review mission performed in March 2018. All reports and the conclusions of the peer review process are publicly available on the ENSREG website (see <http://www.ensreg.eu/EU-Stress-Tests/Country-Specific-Reports/EU-Neighbouring-Countries/Belarus> for details). It is believed that the transparent completion of the stress tests enhanced public and

international acceptance of the new Belarusian nuclear power plant significantly. During the preparation of the National Report the Belarusian nuclear regulator had been efficiently assisted by EU experts to ensure full conformance to the ENSREG specifications and EU best practice.

Conclusions and future cooperation

The long-term nuclear and radiation safety cooperation between the EU and the Republic of Belarus is of prime importance for both parties, as it was proven by the results of the concluded and currently ongoing TACIS and INSC projects. The current status and future perspectives of nuclear safety in the neighbouring countries is an issue of high priority for the EU and during the last decades the INSC has proven to be an efficient and resilient tool to ensure the necessary level of technical cooperation and information exchange with these countries. Belarus has also benefited from the INSC cooperation to a great extent by having access to the latest European developments in nuclear and radiation safety. The above described projects ensured an efficient transfer of nuclear safety know-how and EU experience to the Belarusian partners and promoted the regular application of EU best practice, as well as international standards. It is believed that this know-how transfer contributed to the professional development of the Belarusian nuclear regulator to a considerable extent and enhanced its technical expertise.

It is anticipated that the nuclear safety cooperation between the EU and the Republic of Belarus will be continued beyond the completion of the currently ongoing BY3.01/16 project, as well. The construction of the Belarusian NPP is nearing its completion and the commissioning and the subsequent operation of the two new units will definitely represent new important challenges also to the nuclear regulator. We are convinced that appropriately specified and implemented INSC cooperation projects could assist the Belarusian regulator to fulfil its regulatory duties at a high professional level also in the future.

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