

Nuclear education and training in Lithuania in the context of EU accession

S. Ziedelis^a, J. Gylys^a, V. Gediminskas^b, D. Brandisauskas^c

^aKaunas University of Technology (KTU), Kaunas, Lithuania

^bIgnalina NPP, Visaginas, Lithuania

^cState Nuclear Power Safety Inspectorate (VATESI), Vilnius, Lithuania

E-mail address of main author: Stanislovas.Ziedelis@ktu.lt

Lithuania is a relatively small country with the population of 3,5 mln, disproportionately powerful energy industry and low energy consumption. Installed electricity generating capacities are more than 6 GW, but total power demand is less than 2 GW. Lithuania with average electricity consumption about 2900 kWh per person occupies one of the last places in Europe. Nuclear is the main source of electric energy in Lithuania: it covers 60 - 86% of total electricity production.

Two RBMK-1500 type reactors are operating at Ignalina NPP - the most advanced version of the former Soviet Union channel type reactor design series. The designed electrical power of RBMK-1500 reactor (1500 MW) is the biggest in the world for the single unit. The first unit of INPP was put into operation by the end of 1983 and the second unit – in 1987. After Chernobyl accident the maximal allowed electrical power of each reactor at INPP was reduced to 1350 MW. The initial RBMK-1500 design at Ignalina NPP at the present time has been substantially improved. More than 200 million US dollars of western countries support have been spent, and numerous additional safety features were implemented. Nowadays both Lithuanian and foreign experts agree that the safety level of Ignalina NPP is very similar to the western type NPP's of the same age. Among other factors, the successful exploitation of Ignalina NPP during 20 years was conditioned by well-organized system of personnel training and education.

Preparation of national highly qualified specialists for nuclear industry started in 1978 in the Department of Thermal and Nuclear Energy of Kaunas University of Technology (KTU). At the beginning, the same study programs and curriculum of other higher schools of the former Soviet Union were used. After a pause beginning in 1986 the education process of nuclear energy specialists was restarted at KTU in 1991 and has been continuing successfully in close collaboration with Ignalina NPP, Lithuanian Energy Institute, Obninsk University of Atomic Energy and several organizations of western countries.

At present, a modern, western type system of studies has been implemented at KTU. It consists of 4 levels: Bachelor level (undergraduate studies), Master of Engineering level (professional studies), Master of Science level (graduate studies) and PhD level (post – graduate studies). Duration of studies depends on the chosen level and can continue from 4 to 10 years. Structure and changes of studies' programs, dynamics of numbers of graduates and changes of popularity of nuclear subjects are analyzed in the paper.

Another main source of qualified specialists of nuclear energy is the training system, implemented at INPP and presented in the paper. The training system of INPP is based on

the following sequence of well coordinated and planned activities: selection of candidates – initial check of knowledge – initial individual theoretical and practical training – certification for the position – working in double – additional specific training – authorization for independent work – continuous in-service or refresher training – periodic certification. The effectiveness of training of operational personnel was strongly increased after the full-scale simulator was installed at plant's training centre in 1998. Due to continuous improvement, at present the training system of INPP complies with all requirements of western standards.

During accession process, one of the main EU requirements to energy sector of Lithuania was to shut down both reactors of Ignalina NPP, which were decided to be unsafe in principle. Despite all efforts of Lithuanian specialists and negotiators shutdown of the 1st and the 2nd reactors of INPP is foreseen at the end of 2004 and 2009 respectively. Closure of Ignalina NPP will cause a shortage of power generating capacity as early as in 2010 and also a complex of serious economic, ecological, and social problems. Along with that, a risk occurs of complete demolition of Lithuania's nuclear engineering education and research system.

Some compensative measures to adapt the existing nuclear education and training system to the forthcoming new realities are overviewed in the paper. It is shown that the best solution for the foreseen problems arising due to premature closure of Ignalina NPP could be to continue using nuclear energy in Lithuania. This can be realized by means of:

- Construction of a new nuclear power plant or unit;
- Replacement of present RBMK-1500 reactors by modern and safe western type reactors (e.g., BWR or PWR), using existing turbines and infrastructure;
- Extension of use of the 2nd unit of Ignalina NPP until designed technical resources of equipment durability are depleted.

Selection of one particular option will depend on situation in energy market, sum of investments available and political decision of Lithuanian government. However, essential condition for future maintenance and development of nuclear knowledge in Lithuania is the survival of Lithuania as a nuclear state.