

**Nuclear Education in Russia: status, peculiarities, problems and perspectives**

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For longer than 50-year period of nuclear industry development in the USSR, the specialists training system has been created to meet completely the industrial branch's demands for the specialists of all possible qualifications for research, engineering and production activities. This educational system does exist in Russia till now. In the presentation the following items will be addressed:

- Nuclear Engineering education in Russia: status and peculiarities.
- Demands of nuclear enterprises for the alumni. Role of the Universities in these problems solution.
- Nuclear engineering education problems in Russia.
- Master of science education in nuclear area.
- Perspectives of nuclear education in Russia.
- Integration of nuclear education in Europe: perspectives and problems.

The educational system in nuclear engineering, like an educational system in any other knowledge area in Russia, includes the training activities limited by Russian legislation only:

- academic training of the specialists with award of the State certificates (higher education, re-training, qualification upgrade);
- qualification upgrade of the specialists without award of the State certificates.

The system of education represents a multi-level structure oriented at any possible needs of industrial branches.

At present, more than 20 Russian higher education institutions train the specialists in nuclear engineering. The specialists training in nuclear engineering is being conducted in all these universities in full accordance with common educational curricula and standards which define some peculiarities of the specialists training in this area:

- Combination of fundamental knowledge in physics and mathematics with profound engineering skills,
- Large share of laboratory works.
- Participation at the research work starting from the 4<sup>th</sup> year student.
- Long education time (5-6 years) and period for thesis preparation ( ½ year – pre-diploma internship and ½ year of thesis preparation).
- High level requirements to the students professional culture, including non-proliferation issue.

The demand of R&D Institutes for nuclear engineers is increased during the last 5 years. Now we have more requests from R&D Institutes than can satisfy annually. It can be explained by the reasons related with the difficulties encountered by nuclear enterprises. These difficulties became particularly sharp for the last time when inflow of young specialists into nuclear area drastically decreased. The main problem of nuclear enterprises is the personal aging. During the last 15 years the number of people with the age between 25 and 30 decreased more than twice. At the same period the number of people with the age more than 60 years is increased more than twice. The average age of Doctor of Science is 64, of Philosophy Doctors is 56.

Annual graduation of the specialists in nuclear engineering from the leading Russian universities is quite below the level which is required by nuclear industry. Today, these negative tendencies are far from being overcome. Why ? Answer to the question is hidden in analysis of the difficulties which exist now in Russian nuclear education system itself. Thorough analysis of these difficulties allows me to separate the basic ones:

- Unpopular character of education in Nuclear Engineering area for young people.
- Absence of influx of young instructors (professors) in to the technical universities.
- Aging of equipment and lack of finances for the equipment updating.
- Insufficient financial support from the State bodies for the specialist training.
- Absent of new training textbooks and manuals.

We are sure that some of the problems are our common ones and we need to unite our efforts for its solution.

It is quite obvious that even today the European Union countries have no an available common, generally accepted system for education in nuclear engineering area. It's one aspect of the problem. Another aspect is as follows. In general, very similar problems and difficulties stand before nuclear engineering education in different countries. So, evidently, only unification of nuclear engineering educational systems will make it possible to overcome the difficulties and resolve the problems. But before beginning of all-European integration in the field of nuclear education we need to create the generally accepted system for this education and clarify clearly the steps we need to go through. Today in Russia: Master of Science is equal of Engineer degree level of education. So, we have a rather convenient for us one level continues system of nuclear education in Russia now, we know anything about the engineer, something about the Masters (we have some experience of their education and job placement) but we know nothing about

Bachelors (we can train their but the possible place of work and possible positions are not determined for the bachelors).