TEACHING OF REACTORS PHYSICS IN FRANCE

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ABSTRACT

Brief history

The development of the UNGG reactors posed the problem of the training of engineers and scientists, in particular for EDF, because no university training existed in this field in France during the late 1950s. In response to this need the National Science and Nuclear Techniques Institute (INSTN) was created in 1956.

This Institute is under the coordination of both the Commissariat for Atomic Energy (CEA) and of the Ministry of the Education. Courses were created in the two specific branches of the French system of education, the engineering schools and the classic University.

For example, a Nuclear Engineering diploma program was created in the engineering schools during 1954. In the university context, a Diploma of Studies in Depth (DEA) in Reactor Physics was created a few years later in 1961. (The DEA is the preliminary year to the preparation of a dissertation.) These two branches of education and training still exist today.

Current situation

The diploma program in Nuclear Engineering has been recently reorganized. The program is two years in length. The program recruits students of 'maîtrise', who have had five years of university study after high school, and pupils of engineering schools who can enter directly in the second year. Approximately sixty students per year enter the program. The entering students are distributed over four locations at the schools of Saclay, Cadarache, Grenoble and Cherbourg.

Today the DEA of Reactor Physics is experiencing difficulties in recruiting enough students to maintain the program. A small number of students, approximately 4 to 6 per year, have opted to undergo this specialized training. These studies are offered as an option in a larger DEA (the administrative structure has changed several times in recent years).

Perspectives

The difficulty with these two branches of training is primarily student recruitment (particularly for the DEA), since prospects of a successful career and insertion into professional life are good. Indeed, with about sixty nuclear power plants in operation, there is a continuing need for specialists both for daily management of the park and to investigate improvements in performance (for example, lengthening of cycle). The two trainings programs cited here have to meet this demand. Despite this favourable perspective, an insufficient number of candidates enter this area.

The choice that has been made in France, to require extensive prerequisites for entrance into training in reactor physics and engineering (last year of engineer school or last university year before the thesis), is both a strength and a weakness:

-a strength because the nuclear industry has a constant need for highly trained specialists (others, requiring a lesser training, can be formed "on the heap");
-a weakness because it is difficult to attract students to this field during their first years at the university.

In conclusion, we think that the promotion of these two training programs should be continued. It is necessary indeed, as we have told it, to operate our park of nuclear plants and to maintain the ongoing research in the field. Also, it is necessary for us to prepare for the future: to study the new reactors that will replace, probably, those that are in production today, and to master the fuel cycle and nuclear waste disposal and reprocessing.