Contribution ID: **95** Type: **Oral Presentation**

THE IMPACT OF THE EDUCATION AND TRAINING ON RESEARCH REACTORS FOR THE BUILDING OF THE KNOWLEDGE, COMPETENCIES AND SKILLS

Monday 16 November 2015 11:30 (20 minutes)

The development or the sustainability of the nuclear programs needs the availability of human resources with adequate knowledge, competencies and skills.

In the past, countries that have embarked on nuclear program went first into the design, construction and/or utilisation of research reactors as a first step in the development of the human capacity for their program. Nowadays, some countries are considering a slightly different approach, embarking on a nuclear program without having a research reactor of their own. Nevertheless, it appears that their human capacity building relies on the use of knowledge, competencies and skills of experienced staff that benefited from the utilisation of research reactors. This state of the art tends to show the importance of the research reactors for the development of the human capacity for the nuclear programs.

On the other hand, with the fast development of the technology and in particular of the software applications, calculation codes and simulators (including full scale simulators), it may be considered that such tools could fully replace the utilisation of research reactor for the development of the knowledge, competencies and skills of the personnel involved in reactor design, construction, operation and safety. This subject is a question of debate between those who think that simulators can replace the practical experience on research reactors and those who think that this practical experience cannot be fully replaced by the simulators.

This paper is concerned with the study of the knowledge, competencies and skills that are developed on the research reactors and on the simulators. It compares the contributions of these two different tools to the building of the expertise. It identifies what are the learning outcomes specific to one of these tools and what are those common to both of them. The paper concludes that these two tools are not competing but that they are complementary. In fact, each tool brings some specific bricks in the development of the knowledge, competencies and skills that cannot be gained from the other one.

Further analysis emphasises the importance of the practical experience on research reactors to maintain or to develop the expertise of the personnel involved in the nuclear programs. It shows the impact of this practical experience in making the link between the general principles (in various fields such as reactor principles, neutron kinetics, safety⋯) or the calculations (core design and configuration) with the real behaviour and operational constraints of a reactor. Finally, it shows how important is this practical approach for the development of the safety culture amongst all the personnel involved in the safe operation and utilisation of the nuclear reactors.

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Session Classification: Utilization and Application

Track Classification: Utilization and Applications of Research Reactors