ANALYTICAL AND EXPERIMENTAL ANALYSIS OF YALINA-BOOSTER AND YALINA-THERMAL ASSEMBLIES

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Accelerator Driven Systems (ADS) may play an important role in future nuclear fuel cycles to reduce the long-term radiotoxicity and volume of spent nuclear fuel. It is proposed that ADS will produce energy and incinerate radioactive waste. This technology was called Accelerator Driven Transmutation Technology (ADTT). The most important problems of this technology are monitoring of a reactivity level in on-line regime, a choice of neutron spectrum appropriate for incineration of Minor Actinides (MA) and transmutation of Long Lived Fission Products (LLFP) and etc. Before the designing and construction of an installation it is necessary to carry out R&D to validate codes, nuclear data libraries and other instrumentations.

The YALINA facility is designed to study the ADS physics and to investigate the transmutation reaction rates of MA and LLFP. The main objective of the YALINA benchmark is to compare the results from different calculation methods with each other and experimental data. The benchmark is based on the current YALINA facility configuration, which provides the opportunity to verify the prediction capability of the different methods. The experimental data have been obtained in the frame of the ISTC Projects B1341 “Analytical and experimental evaluation of the possibility to create a universal volume source of neutrons in the sub-critical booster assembly with low enrichment uranium fuel driven by a neutron generator” and B1732P “Analytical and experimental evaluating the possibility of creation of universal volume source of neutrons in the sub-critical booster assembly with low enriched uranium fuel driven by the neutron generator”.

In this paper a comparison of the experimental and calculated data obtained for YALINA-Booster subcritical assembly with a fuel of different enrichment and for YALINA-Thermal with a different number of control rods (216, 245 and 280) will be done.