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Wtorek: 12.02.2019, 11:30
PNT-NCBJ, sala 251 (PROTON)

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**The effect of the control rods on safety parameters of the
Research Reactors**

Abstract:

In this work, the effect of considering the control rods has been investigated experimentally and numerically. We studied the effect of control rods on safety parameters in the steady states and transients by using of MTR_PC software package. All the neutronic and thermohydraulic parameters in 61 core in the presence of 0% and 70% of control rods for the steady-state and transient were calculated and the results were compared by safety standards. The results show that, in the steady-state, the presence of control rods in the core increases the power peak and changes the peak position. This fact leads to increasing of safety in compare with the absence of control rods. Despite of using the control rods, none of the parameters do not exceed over the limits permitted limit and are compatible with the safety standards. To complete the study, investigation of the effect of control rods in transition state conducted only for a reactivity injection scenario in the worst case. The results showed that thermohydraulic safety parameters were improved and the peak power was decreased. Due to unexpected results, studies was attended by applying reactivity coefficients at the presence of control rods. Again, the results were lower than the previous once. Comparing the results shows that although the presence of the control rods leads to increasing of the power peaking factor, the control rods increases the safety of the reactor in transient states.

Serdecznie zapraszamy,
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