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Some Characteristics of Hypothetic TVSA with Fuel Enriched beyond 5% for VVER-1000

The paper presents comparison of regular TVSA with average enrichment of 4,386% and hypothetical TVSA with enrichment of 10% based on design parameters and materials of TVSA fuel assemblies produced by TVEL (Russia), which today are widely used at nuclear power plants in Ukraine. It is shown that implementation of new fuel assemblies will result in improved use of fuel and increase of installed capability factor. At the same time, fresh and spent fuel management systems shall be modernized to meet relevant nuclear safety criteria. The paper analyzes possible criticality initiation at different stages of severe accidents related to core melt and using fuel with higher enrichment.

Keywords: fuel enrichment, nuclear safety, neutron multiplication factor, core melting.