Coupling of the TRITON and FEMAXI6 Code

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Abstract. The scope of current research in the field of fuel performance is primary aimed to an improvement of the operating reliability, safety and cost effectiveness of the reactors in operation. The current requirement of nuclear industry is to have a fuel suitable for load follow operation. Fission gas release, PCMI and stress corrosion cracking are the main phenomena that limit the variability of reactor operation from a safety perspective. To reasonable predict the fuel performance limits it is necessary to benchmark the computational tools against high quality experimental data. This work is devoted to the calculation of WWER-440 fuel performance using the code FEMAXI-6 based on the tests carried out under single ramp conditions and step-by-step power increase in the MIR reactor in 1990's. The fuel assemblies were pre-irradiated at Kola NPP Unit 3 with maximal burn-up of about 50 and 60 MWd/kg and selected fuel rods were refabricated and equipped by the thermocouples and pressure sensors. Objective of the analyses is to validate adaptation of the FEMAXI-6 code coupling with TRITON sequence of the SCALE system. In the first step, the fuel performance calculations are carried out based on WWER fuel and cladding material E-110 material database implemented in the FEMAXI-6 code. Subsequently the depletion calculation will be optimized based on coupling with TRITON sequence calculations. Radial power distribution and helium content will be compared and transferred between codes as a function of the irradiation history. Fuel centre temperature and Fission Gas Release will be evaluated based on real experimental data and depletion calculation method.