

Initial efforts to benchmark Bison for VTR driver fuel analysis

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Efforts are under way to benchmark the Bison nuclear fuel performance code for use in analysis calculations for the Versatile Test Reactor (VTR) project. The proposed VTR driver fuel concept is a uranium-plutonium-zirconium (UPuZr) ternary alloy metallic fuel clad in HT9 with liquid sodium bond material filling the initial fuel-cladding gap. Assessment of this combination of materials with Bison requires benchmarking Bison using data from relevant experiments performed in EBR-II and FFTF. Results from simulations will be compared to available experimental data including post-irradiation examination (PIE) results and, where possible, in-core measurements. Preliminary results so far are encouraging overall. Reasonable agreement has been found between many calculated and measured quantities. Results of initial calculations also helped identify several possible improvements in Bison material models that can enhance accuracy and code performance. This talk will present some basics on the proposed VTR driver fuel concept, the approach being pursued for benchmarking Bison for use in the VTR project, experiments from FFTF and EBR-II that have been identified as being of interest, results so far, and future work to continue these efforts. The work reported in this summary is the result of R&D studies supporting a VTR concept, cost, and schedule estimate for DOE-NE. The technology and location for the VTR have not been selected, as this is part of a formal DOE process. As such all information provided herein must be considered preliminary.