



FUEL DIMENSIONAL STABILITY IN CZECH WWER REACTORS

**J. Belac¹⁾, D.Ernst²⁾, M. Lehmann¹⁾, V. Mecir²⁾, A. Miasnikov³⁾, R. Svoboda²⁾, S. Stech²⁾,
P. Vesely²⁾, M. Valach¹⁾**

- 1) Nuclear Research Institute Rez plc., Rez, Czech Republic
- 2) CEZ, a. s., Prague, Czech Republic
- 3) State Office for Nuclear Safety, Prague, Czech Republic

Abstract

Safety and reliability of WWER reactors operation with advanced Russian and Westinghouse nuclear fuel designs and modern optimized core loading patterns has to comply with strict design and safety licensing criteria. Systematically applied licensing approach in Czech republic is consistent with US licensing practice and Russian regulation, and meets as well all IAEA Safety Guides and recommendations. Deregulation of the electricity markets forces power utilities to deploy nuclear fuel more intensively and operate closer to the design and Technical Specification limits. Maintenance and justification of the acceptable safety margins is possible only by application of advanced analytical techniques in the area of fuel design, operation and post irradiation testing.

One of the most important issues is an assurance of the dimensional stability of the most strained core components such as fuel rod cladding, spacer grids, guide thimbles, nozzles and joints.

Presented paper addresses the following three particular aspects:

- licensing approach to the proof of the safety acceptable fuel design limits;
- results of practical implementation of the surveillance requirements applied during the Temelín NPP first core start-up;
- long term fuel post-irradiation inspection program.

Future trends in safety and reliability assurance of the nuclear fuel in low leakage loading patterns with high burn-up and long in-reactor residence time in Czech WWER reactors are outlined.