

**RERTR 2016 - 37th INTERNATIONAL MEETING ON
REDUCED ENRICHMENT FOR RESEARCH AND TEST REACTORS**

**OCTOBER 23-27, 2016
RADISSON BLU ASTRID HOTEL
ANTWERP, BELGIUM**

**Transient Thermal-Hydraulic Safety Analysis of the BR2 Research
Reactor with RELAP5**

**E. Sikik and G. Van den Branden
BR2 Reactor, Nuclear Materials Science Institute, Belgium Nuclear Research Centre SCK•CEN
Boeretang 200, 2400 Mol – Belgium**

**J. Licht, A. Bergeron and B. Dionne
Nuclear Engineering Department
Argonne National Laboratory, 9700 S. Cass Ave., Argonne, IL 60439 – USA**

ABSTRACT

The code RELAP5/Mod3.3 was used to perform transient thermal-hydraulic safety analyses of the BR2 research reactor to support conversion from Highly-enriched to Low Enriched Uranium fuel (HEU and LEU, respectively). An input model was developed and validated against select loss of flow and loss of pressure experiments performed in 1963. The model was then updated to represent the current use of the reactor; taking into account core configuration, neutronic parameters, trip settings, component modifications, etc. Simulations of the 1963 type experiments were repeated with this updated model to re-evaluate the core cooling conditions. Additional simulations, such as loss of coolant accidents, were completed to demonstrate that conversion to LEU fuel does not change the core cooling conditions of the fuel elements significantly.