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Seminarium Zakładu Energetyki Jądrowej i Analiz Środowiska (UZ3) Departament Badań Układów Złożonych (DUZ)

Wtorek: **16.11.2021**
11:30

Maciej Skrzypek

Study of natural circulation in steady states conditions - RELAP5 validation

Abstract:

Work presented in this seminar is a result of the collaboration of the National Centre for Nuclear Research (NCBJ) and the University of Illinois at Urbana-Champaign (UIUC). Experiments have been performed in the Multiphase Thermo-fluid Dynamics Laboratory (MTDL) at the UIUC including steady-state natural circulation conditions with and without steady periodic oscillations. For those experiments, the experimental loop facility, with a 5 m vertical annulus test section was used. A 3 m immersion heater (capable of up to 300 kW/m²) forms the inner wall of the annulus test section and is directly upstream of a 2 m unheated chimney section of the same geometry. The boundary conditions of the experiments can span a wide range of pressure (150-950 kPa), heat flux, liquid subcooling, and adjustable inlet pressure loss.

During the presentation, the natural circulation facility, RELAP5 model, experiment conditions and simulations results will be described and the results of non- oscillation conditions will be presented. The RELAP5 mod 3.3. code results are compared to the experimental measurement of void fraction, pressure, temperature and flow rate, which are crucial parameters for code validation.

Some unstable cases were studied in parametric analysis and the stability criteria were observed. All the results of simulations are collected in the report NUREG. This presentation briefly describes the main outcomes.

Serdecznie zapraszamy
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