LITHUANIAN ENERGY INSTITUTE

ADMISSION TO PHD STUDIES FOR THE YEAR 2026

DOCTORAL RESEARCH TOPIC:

Numerical studies of nuclear safety of the geological repository for spent nuclear fuel

RESEARCH FIELD:

Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

The management of spent nuclear fuel (SNF) from the operation of the Ignalina Nuclear Power Plant (INPP) in Lithuania is a complex, long-term and challenging process. Currently, all the SNF at the INPP is placed in special dry storage casks, where it will be stored for 50 years. During this storage period, various socio-economic, geological, environmental and other studies shall be carried out to select the location of the geological repository on the territory of Lithuania and to justify its nuclear and radiation safety. One of the tasks to justify nuclear safety is the assessment of the nuclear criticality of the SNF placed in disposal containers. From a conventional SNF storage casks, the assessment of the nuclear criticality of a disposal container containing SNF in a geological repository must take into account various scenarios of the repository's evolution over hundreds and thousands of years, which may lead to the possible degradation of the material in the container and the SNF itself, formation of chemical compounds, entrance of neutron moderating materials into the container, and formation of other conditions that are unfavourable from the point of view of nuclear criticality.

The aim of this proposed research is to perform numerical investigations of the nuclear criticality of the RBMK-1500 spent fuel geological repository, based on the concept of the Lithuanian geological repository, in order to justify the nuclear safety of the repository under various operating conditions and scenarios of the repository evolution. This will require to create and develop the numerical models, to perform analysis and selection of repository evolution scenarios and the identification of the conditions that determine nuclear criticality. The studies would contribute to the implementation of the spent fuel geological repository project in Lithuania and its safety justification.

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