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Summary of the doctoral thesis:

„The application of probabilistic methods in the safety classification of systems, structures and components of MARIA Research Reactor"

The safety classification of structures, systems and components (SSC) in a nuclear reactor project is a key summary of their importance for nuclear safety. This thesis presents a safety classification procedure for research reactors, which is a different and more analytically demanding category of nuclear facilities than nuclear power plants. The focus is on probabilistic analyses, which have not yet been sufficiently described in the subject literature. The author explains the basic assumptions of probabilistic analyses, the method of incorporating their results into the safety classification process and proposes an extension of the methodology used so far that more accurately represents the operational risk of universal safety functions in a nuclear reactor. The proposed procedure is compatible with International Atomic Energy Agency recommendations and with the requirements of Polish law. It was used in the classification process of the MARIA research reactor. In the thesis, historical data from the operation of MARIA reactor is used in the review of input data sources for probabilistic safety analyses, in comparison with the IAEA research reactor database and the US NRC nuclear industry database. The author proposes a method to integrate the databases in order to create the input data source optimal for the safety analyses and classification of the research reactor.

Keywords: safety classification, SSC classification, research reactors, PSA, PRA

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