

PREFACE

The Ignalina Nuclear Power Plant is Lithuania's only nuclear power plant producing ~80 % of electricity in the country. The plant consists of two units with RBMK 1500 reactors commissioned in December 1983 and August 1987. The reactor of Unit 1 is shutdown in December of 2004.

The RBMK-1500 is a graphite moderated, boiling water, channel type reactor with a total of 1661 vertical parallel fuel channels and numerous components such as headers, pumps, valves, etc. The RBMK-1500 reactors of the Ignalina NPP are protected by a pressure suppression type containment, which, because of its specialized nature, is referred to as the Accident Localisation System (ALS). The ALS forms the last barrier preventing radioactive material release to the environment, i.e. it is designed to prevent the release of contaminated steam-water mixture to the environment in case of Loss-of-Coolant Accidents (LOCA). The ALS response to the range of LOCA is described in this monograph. One of the peculiarities of Ignalina NPP with RBMK-1500 reactors is that not all of the reactor coolant circuit is enclosed within ALS. In this case the function of last barrier perform other building structures of Ignalina NPP. Nevertheless, the requirements of safety standards regarding limits of radiological doses shall be met in the case of any LOCA. Therefore, besides the ALS response analysis, other possible places of LOCA are considered in this monograph, and the analysis of thermal hydraulic parameters in the affected by LOCA Ignalina NPP compartments is performed.

Many individual and several cooperative projects have greatly expanded the design data base and the general understanding of RBMK plants in the last few years. Notable in this respect are Safety Analysis Reports, Barselina project, Probabilistic Safety Analysis of Level 2, and number of the reports issued in the frames of PHARE and European Union Framework Programme as well as in the frames of bilateral cooperation between LEI and foreign organisations (for example, GRS mbH (Germany), Jacobsen Engineering Ltd (UK) and Scientech (USA)). The study presented in this monograph fits into the above context. It serves both to summarise the information available regarding the

unique system of Ignalina NPP compartments and it employs state-of-the-art analysis techniques to verify the response of the ALS and other compartments to a broad range of LOCA events.

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