Contribution ID: **64** Contribution code: **S01-NPNE-102** Type: **Oral presentation (virtual)**

Application of the ASTECV2.2b Severe Accident Computer Code and Sunset Computational Tool for Uncertainty and Sensitivity Analyses on IVMR VVER1000 Test Case

Tuesday, 30 August 2022 16:45 (15 minutes)

This article concerns an uncertainty and sensitivity investigation of certain parameters in the In-Vessel Melt Retention (IVMR) test case for VVER-1000/v320. It has been used the ICARE and CESAR modules of ASTECv2.2b severe accident computer code to describe the basic parameters behaviour and the main phenomena arising during the IVMR in VVER1000 reactor design. The external vessel water cooling has been chosen for IVMR strategy. First, one stand-alone calculation have been done to account the most heat loaded segment from the vessel.

After, the uncertainties in two parameters in the deterministic calculation have been investigated additionally to account their influence on the heat flux on this segment. An opportunity for an uncertainty and sensitivity analyses gives SUNSET (Statistical UNcertainty and Sensitivity Evaluation Tool) software which is a part of ASTEC computer code. The SUNSET computational tool developed by IRSN, is a statistical tool designed for uncertainty and sensitivity analysis of mathematical or physical models like computer codes.

It have been investigated an influence of the different pressure values inside the vessel and influence of the different temperature values of outside cooling water on the two basic output parameters: heat flux on the most heat loaded segment of the vessel and the minimal vessel wall thickness of this segment. It was found out to what extent each one of the both input parameters effect on the studied output parameters.

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Session Classification: S01 Nuclear Physics and Nuclear Energy

Track Classification: Scientific Sections: S01 Nuclear Physics and Nuclear Energy