

## Analysis of Passive Heat Removal System by ANSYS FLUENT software

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In the current study, the model of Passive Heat Removal System (PHRS) through SG (steam-generator) was developed for computational fluid dynamics (CFD) analysis. Passive Heat Removal System is a protective safety system of Nuclear Power Plant based on the principle of a passive action, designed to provide long-term heat removal from the reactor core via secondary circuit. A thorough description of the steam condensation process in the passive cooling system obtained as a result of the analysis. The rate of the steam condensation in heat exchanger pipeline was assessed and compared with previous results calculated by "ANSYS CFX" software.

### Summary

During work, there was done three main tasks: creating a geometrical form of one PHRS tube, an appropriate meshing of the model to achieve a better analysis of thermo-hydraulic phenomena and creating domains with physical properties for simulation of steam condensation in passive heat removal system's heat exchanger tubes. Analysis through the "ANSYS Fluent" software, with several different cases, investigated. Furthermore, results, which matched with input parameters in previously analyzed calculations by another ("ANSYS CFX") software, are compared to each other. The simulation showed more relevant results to experimental ones in contrast to the first software. As a result of calculation main and the important physical parameters are presented in this work for the inlet pressure scale of 1-7MPa and temperature scale of 180-300 degree Celsius, which are corresponding to the values during different types of failures and/or accidents in Nuclear Power Plant.

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