Reactor Coolant System Hot Leg Temperature Reduction in Korean Next Generation Reactor

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Abstract

Reactor Coolant System (RCS) hot leg temperature (Thot) in the Korean Next Generation Reactor (KNGR) design is reduced from that of the Korean Standard Nuclear Plant (KSNP) to minimize the potential for steam generator tube corrosion cracking in accordance with the Korean Utility Requirements Document requirements, and to increase the reactor core thermal margin. Evaluation has been conducted to define the impact of the RCS Thot reduction on the plant operating parameters, RCS component design and plant efficiency for the KNGR. This paper also presents the results of the parametric study to obtain an understanding of the impacts of modifying specific parameters such as steam generator secondary pressure or Thot to the KNGR using the LAZYE code. Results of the evaluation propose the principal design and operating parameters for the 4000 MWt KNGR.

A Study on Natural Circulation for Conceptual Design of Long Life Liquid Metal Reactors

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Abstract

A preliminary feasibility study was carried out of the long life liquid metal reactors, through the reactor vessel wall of which the fission generated heat is transferred from the primary coolant to the secondary coolant a novel reactor concept. This paper is based on the application of the preliminary design and the investigation of the stability of natural circulation. A reference model configuration was employed in the 4S(Super, Safe, Small and Simple) of CRIEPI, which is geometrically modified in respect of design requirement. The preliminary design, thermal-hydraulic and thermodynamic analyses are all done using analytic formulations. The investigation on stability of natural circulation is theoretical, which includes the linear stability analysis. A small long life liquid metal reactor was so designed that it has the power level of 125MWth and the performance of 100% natural circulation in primary system. Stability of the designed condition is investigated in the step of theoretical analysis.