

핵연료 조사시험설비 구축 현황

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Status on the Construction of the Fuel Irradiation Test Facility

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Key Words: HANARO(하나로), Fuel Test Loop(핵연료 노내조사시험설비), In-Pile Test Section(노내시험부), Out-of-Pile System(노외시험부), IPS Vessel assembly(노내시험부 압력용기조립체)

Abstract : Fuel Test Loop conceptual design was set up in 2001 and had completed detail design including a design requirement and basic piping & instrument diagram (P&ID) in 2004. The safety analysis report was prepared and submitted in early 2005 to the regulatory body(KINS) for review and approval of FTL. In 2005, the development team is going to purchase and manufacture hardwares and make a contract for construction work. In 2006, the development team is going to install a FTL system performance test shall be done as a part of commissioning. After a FTL development which is expected to be finished by the 2007, FTL will be used for the irradiation test of the new PWR-type fuel and the usage of HANARO will be enhanced.

A Study on Aperiodic Instability for a Once-Through Steam Generator with a Tube-in-tube Modular Feedwater Line

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이중 급수관이 장착된 관류형 증기발생기의 유동불안정성에 대한 연구

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Key Words: Aperiodic Instability(역류성 유동불안정성), Once-Through Steam Generator(관류형 증기발생기), Integral Reactor(일체형원자로)

Abstract : A once-through steam generator (OTSG) with a modular feedwater line (MFL) is located inside an reactor vessel. A sufficient heating of the feedwater in the MFL can cause an aperiodic instability especially at low flow and low pressure conditions. Aperiodic instability is an instability related to the change of a flow direction in individual steam generating U-shaped channels with downcomer-riser movement, which operate at given pressure difference. The nature of an aperiodic instability is close to a Ledinegg instability related to the presence of multiple flows at the full hydraulic curve of a U-shaped channel. In this paper, the conditions for a reverse flow at the OTSG with a tube-in-tube MFL are studied. From the results of the studies, it is revealed that the change of a flow direction in the pipes is due to the boiling of the feedwater in the downcomer branch of the U-shaped pipe and that multiple flows start in the area of the extrems corresponding to the minimum pressure differentials of the hydraulic curves.