Contribution ID: **162** Type: **POSTER**

Structural Design and Evaluation of a Steam Generator in PGSFR

Tuesday 27 June 2017 17:30 (1h 30m)

A once-through steam generator(SG) in SFR(Sodium-cooled Fast Reactor) coverts the sub-cooled feedwater to superheated steam by transferring heat from the IHTS(Intermediate Heat Transport System) sodium to water/steam and provides superheated steam during normal power condition. It is a heat exchanger as well as structural barrier between liquid sodium and water/steam and thus is regarded as one of the most critical components in SFR deciding the plant reliability and availability.
The PGSFR(Prototype Gen-IV SFR) employs a vertical once-through shell-and-tube heat exchanger which has a sodium-to-water counterflow with single-walled straight heat transfer tubes. A PGSFR SG is designed to have 196 MWth power capacity and generates steam at 16.7MPa and 503℃. Its construction material is 9Cr-1Mo-V for high heat transfer performance and allowable strength at high temperature region. It uses the straight tube so that it is possible to apply single piece tube without any weld for tube-to-tube joint. Since straight tubes do not provide enough flexibility to accommodate the longitudinal expansion difference between tubes, flow distributors are applied for uniform flow at inlet shell. And, expansion bellows joint was joined on the main shell to provide a large flexibility to compensate for differential thermal expansion between shell and tube bundle.
In this study, structural design for a PGSFR SG was described and structural integrities against representative operating duty cycle event were evaluated by ASME B&PV Section III Division 5. From the evaluation results, the structural design issues were found and structural applicability with design improvement was ensured.

Country/Int. Organization

South korea/

Author: Mr PARK, Chang-Gyu (Korea Atomic Energy Research Institute)

Presenter: Mr PARK, Chang-Gyu (Korea Atomic Energy Research Institute)

Session Classification: Poster Session 1

Track Classification: Track 1. Innovative Fast Reactor Designs