Preliminary study on heat balance of 100MWe long fuel cycle sodium-cooled fast reactor

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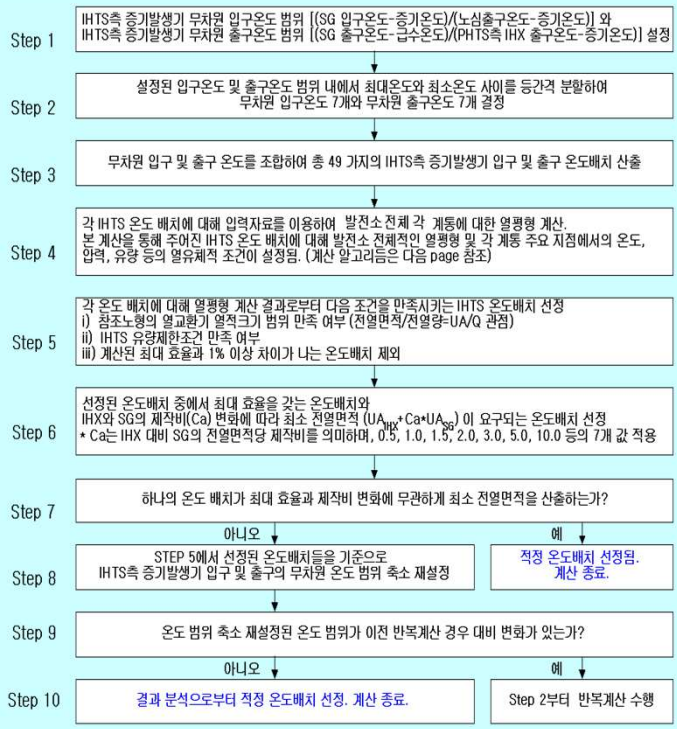
Objective

- Decision of normal operating condition on PHTS&IHTS&BOP based on design review of previous reactor design
- Development of heat balance of SALUS using DENOP code

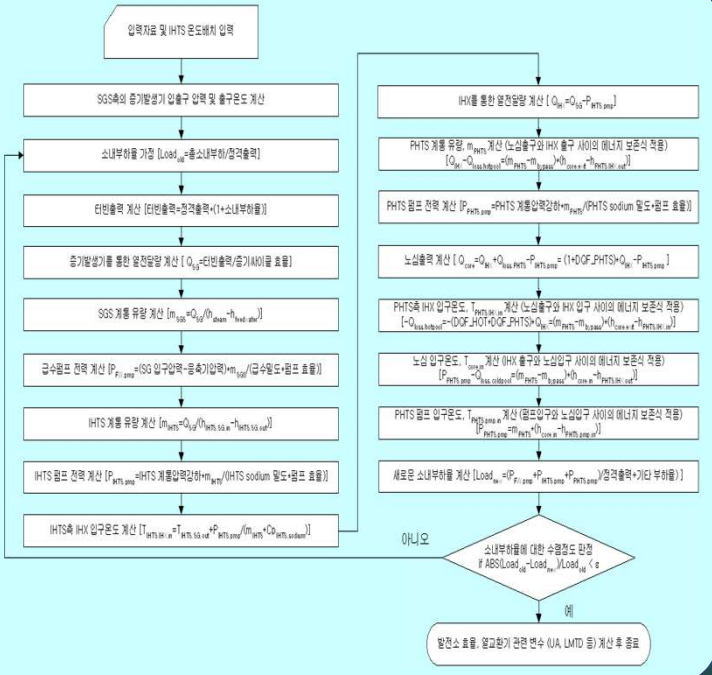
SALUS

- ***S**mall, **A**dvanced, **L**ong-cycled and **U**ltimate **S**afe sodium-cooled fast reactor*
- 100MWe long fuel cycle SFR system under consideration in KAERI
- Design target of 20 years of operation period
- Basic design features are almost same to PGSFR design such as metal fueled reactor, cold pool DRACS, 2 passive and 2 active decay heat removal system, 2 PHTS mechanical pumps, 2 IHTS and 4 IHXs, etc.

Procedure of IHTS temperature arrangement



Procedure of heat balance decision



Input parameter decision and its comparison with other design

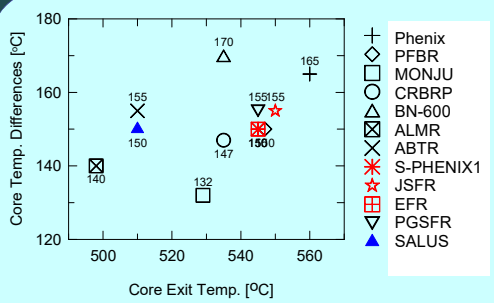


Fig. Core temperature differences with respect to core exit temperature

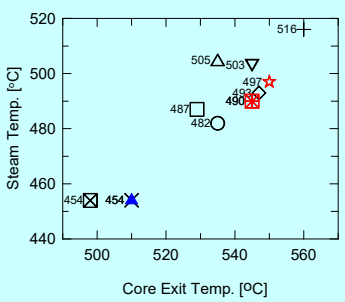


Fig. Steam temperature

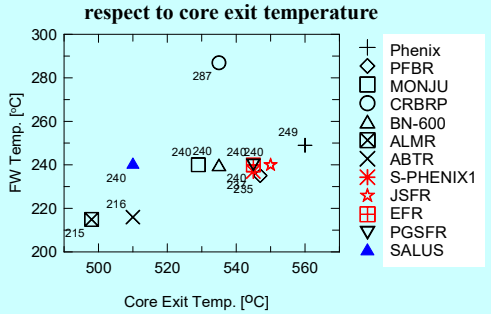


Fig. Feedwater temperature

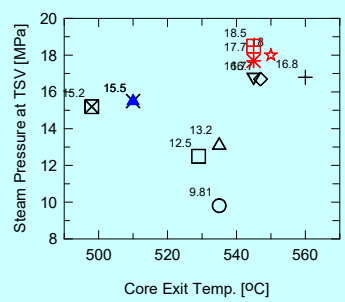
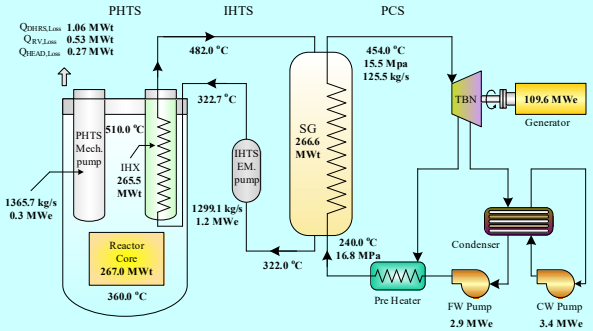


Fig. Steam pressure

Heat balance diagram



Net Plant Power = 100.0 MWe
Gross Efficiency = 41.0 %
Net Efficiency = 37.4 %

Fig. Heat balance diagram of 100MWe SALUS