Contribution ID: **468** Type: **ORAL**

Main operation procedures for ASTRID gas power conversion system

Tuesday, June 27, 2017 11:40 AM (20 minutes)

Until the end of the first part of the basic design phase (2017), the ASTRID project has made the choice of studying a power conversion system (PCS) based on a Brayton cycle with nitrogen as coolant. The justification is related to a safety and public acceptance considerations in order to inherently eliminate the sodium-water and sodium-water-air reactions risks. The objective of the studies engaged is to enhance the level of maturity of the gas PCS as close as possible to the classical Rankine cycle. The choice of two PCS of 300 MWe each has been made in order to limit the gas inventory, the size and length of gas pipes as well as maintaining a high level of availability.
This paper presents the current architecture of the gas PCS, the layout of the tertiary circuits and will also deals with specific operating procedures as start-up of the plant, scram, normal shutdowns and grid frequency control. The current procedures in the three circuits of the plant and the expected regulation will be presented. A focus will be made on the nitrogen inventory control which takes part of the electric power regulation provided to the grid. When possible, the comparison with the vapor PCS will be shown in terms of impact of thermal transients on structures.
Finally some perspectives of the gas PCS use for the future of the sodium fast reactors will be drawn in terms of better cost-effectiveness of operation through optimization of its Brayton cycle.

Country/Int. Organization

France/French Atomic and alternative energies Commission

Primary author: Mr BARBIER, dominique (CEA)

Presenter: Mr BARBIER, dominique (CEA)

Session Classification: 1.3 SYSTEM DESIGN AND VALIDATION

Track Classification: Track 1. Innovative Fast Reactor Designs