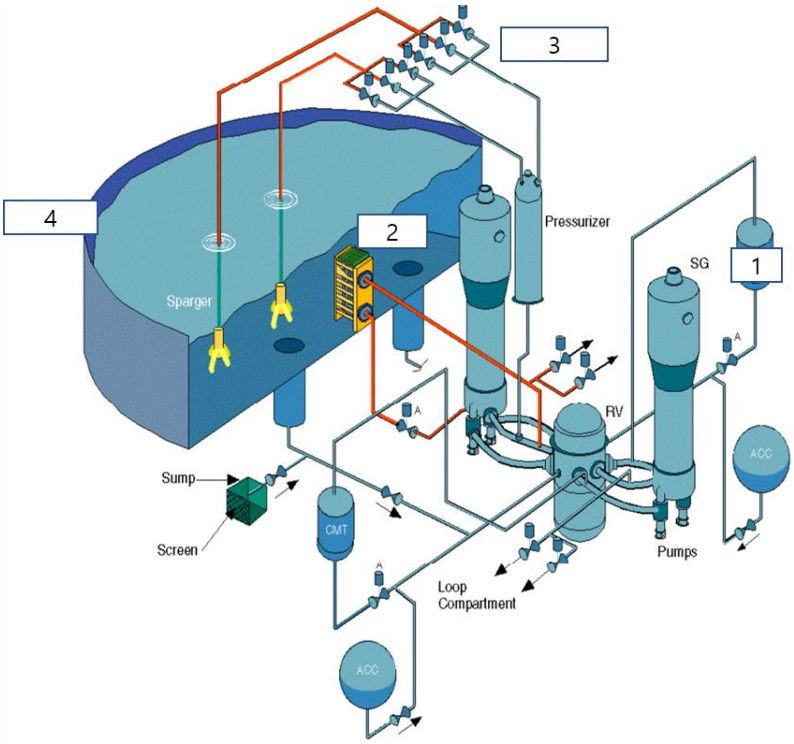
2021. 05. 14. Nuclear Systems Engineering Mid-term Exam (16:00~18:00)

1. Explain the followings regarding PWR: [65 pts]
   A. [AP1000] Describe the function of the components 1~4 and their working procedure during a station blackout condition



   B. In the safety system of APR1400, how could the LPSI pumps be removed? Explain it with required ECC flow rate.
   C. Internal structure of moisture separator reheater of a conventional PWR. Include the explanation on the heat source and usage of drained water.
   D. Working principle of the non-condensable gas removal system in a condenser. Why should it be removed?
   E. Internal structure of a PWR steam generator. Include the flow paths, inlet and outlet nozzles, and the description on the recirculation ratio.
   F. PWR power conversion system has several steam extractions and their cascades to lower number feedwater heaters. Describe their cascade procedures and why many feedwater heaters are required?
   G. Internal structure of fluid device and its working principle

2. Explain the followings regarding BWR: [20 pts]
   A. Reactor vessel internal structure. Include the roles of recirculation pumps and jet pumps.
   B. Working principles of the isolation condenser and reactor core isolation cooling

C. In Fukushima daiichi nuclear accident
    i. Current status of reactor circulation cooling
    ii. The reason why core melting in Unit-1 began such quickly

3. Explain the followings regarding CANDU-6 [15 pts]
    A. The reason why CANDU uses heavy water
    B. Configuration of the heat transport system (primary system)
    C. Reactor internal structure from the calandria tube to fuel rod

4. 보너스 (5점)

현재까지 강의 중 설명이 충분치 않아 이해가 어려웠거나, 추가로 알고 싶은 신형 원자로 및 미래형 원자로는?