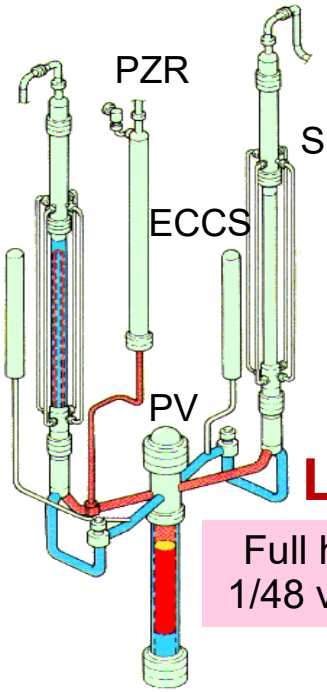
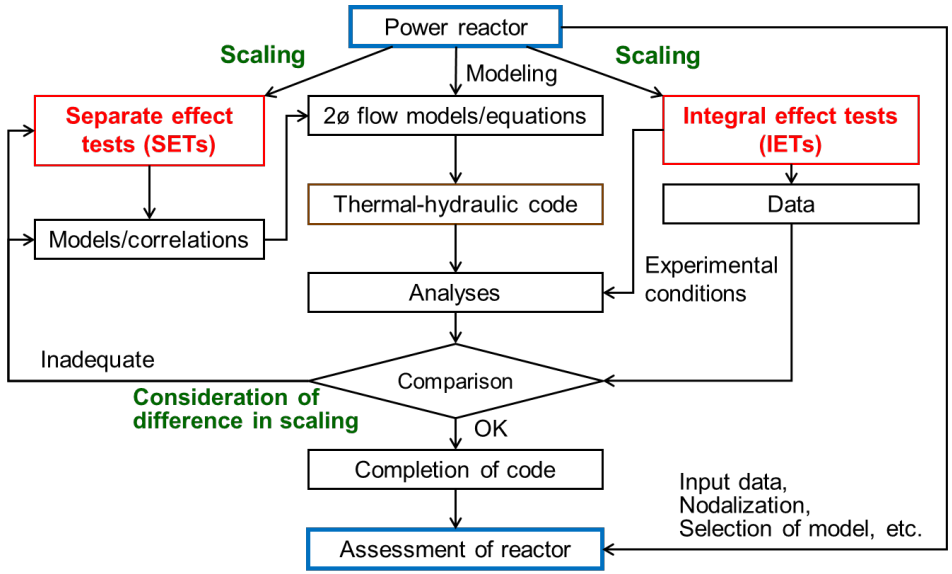
Verification method for scalability of phenomena for SMR designs (scaling approach as technical and economic strategy) (1/2)

- It is crucial to validate predictability of thermal-hydraulic (T/H) codes by leveraging experimental data under wide range of conditions when performing safety analyses for SMRs.
- Elucidating T/H phenomena involved is needed by experiments simulating systems (e.g., passive safety system) related to SMR.
- **Relating integral effect tests (IETs) with LSTF in 1990s at JAEA**
  - *Numerous experiments were conducted simulating SBLOCAs in ROSA/AP600 testing program with modified LSTF by adding components specific to Westinghouse AP600 design.*
    - ✓ AP600 passive safety components generally functioned as intended, leading to core cooling being preserved.
  - *Investigation through SBLOCA test was done for PWR designs that adopted passive safety systems, i.e., secondary-side automatic depressurization system (**SADS**) and gravity-driven safety injection system (**GDIS**).*
    - ✓ Primary pressure was reduced to **GDIS** injection pressure using only **SADS**, ensuring long-term passive core cooling.



Verification method for scalability of phenomena for SMR designs (scaling approach as technical and economic strategy) (2/2)

- Experiments with scale-downed T/H test facilities are roughly categorized into integral effect test (**IET**) for whole system of target SMR and separate effect test (**SET**) for its component(s).
  - *If SMR safety analysis results do not match with **IET** results, obtaining experimental data through **SET** are necessary to refine analytical models / correlations, with attention to scaling differences.*



- T/H test facilities in many countries have been used to acquire test data for supporting SMR safety research.
  - *Scaling ratios & scaling methods to target SMRs may differ among country's test facilities.* ***Ex.*** *volumetric scale of LSTF: 1/48, modified LSTF: 1/30.5, based on power-to-volume scaling.*
- **It is desirable to share, aggregate, and compare experimental databases obtained from T/H test facilities to verify method for scalability of T/H phenomena for SMR designs.**