Utility Requirements for Fast Breeder Reactors

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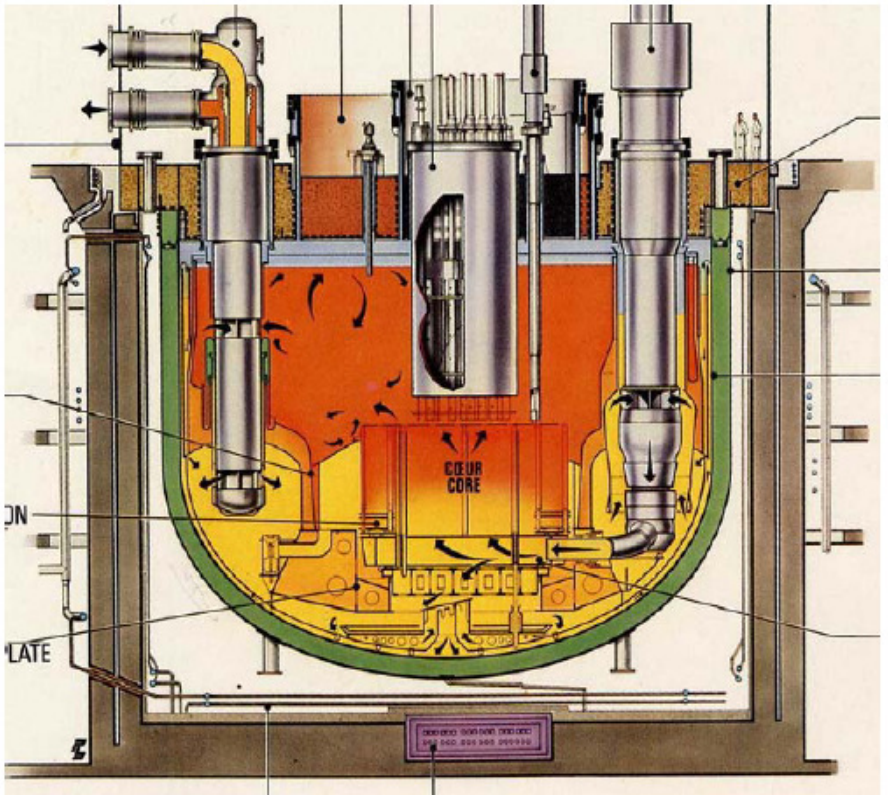
EDF's R&D program for the industrial Gen 4 SFR

- R&D on Gen 4 systems: ~ 5% of EDF nuclear R&D budget
- Around 30 engineers on SFR program
- EDF plays the role of a utility, not of a designer nor of a vendor nor of a government R&D agency
- Five projects:
  - **Fast reactor and system studies**
  - **Materials**
  - **Deployment strategies and scenarios**
  - **Fuel Cycle**
  - **Operation feedback analysis and design requirements**
- EDF party of the trilateral French SFR program in partnership with CEA and Areva



the Superphenix reactor

The main job of a utility : to write requirements for FBR (1/2)

- For industrial LWR reactors, we wrote with others the EUR files
- For industrial and prototype FBR reactors, it is more difficult
  - Writing is intertwinned with (ambitious) research, we are not in an evolutionnary design
  - This is why we have a small size R&D and engineering team (30 p)

- The french government and its public lab CEA want to go fast
  - Writing in parallel both the industrial 2050 reactor requirements and contributions to the 2020 « industrial » prototype requirements
  - Contributions : we can say sensible things for 25 to 30% of the level 1+ requirements, of this prototype not more…..(Our paper on Monday)

The main job of a utility : to write requirements for FBR's (2/2)

- We focus on (prototype level)
  - Safety (Core and Sodium technology) First official letter from the safety regulator : july 2009, and we are busy answering it, in the trilateral french Framework
  - Core physics
  - Operations and availability we want to measure a yearly availability factor, we want to improve dramatically with respect to Super Phenix
  - In Service inspection and repair : we want to be able to empty the Sodium from the reactor vessel for inspection of the lower structures, unload and reload the core. Future technologies will be welcome if the design is not frozen too fast.
- Commercial Size Reactors : We have already said at the Global 2009 Conference that Economics would determine deployment or not
  - What extra investment costs (sodium technology in the 21st century) can fuel cycle costs (said to be rising around 2050) compensate ?
- For the prototype, we feel that safety (all subjects) and good operations (requiring inspection) will be the first 2 key requirements to demonstrate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