Preventive Measures for Avoiding Handling Problems from the Operators View

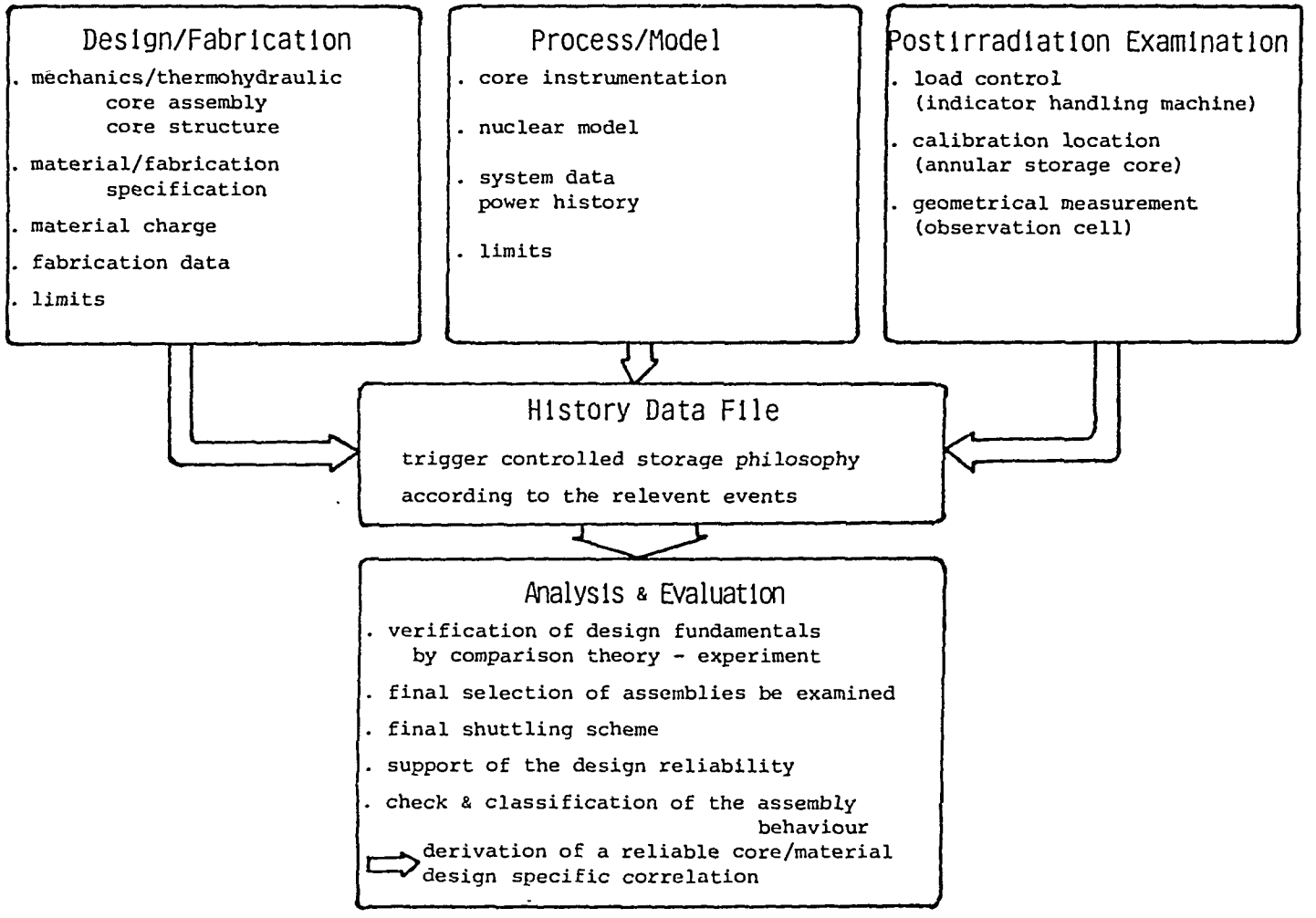
The SNR 300 is approaching first criticality (end of 1985). In this context all the means for a proper operation of the plant have to be specified and defined.
Particulary concerning core physics and assembly behaviour unexpected exceeding values for distortion/growing would lead to severe handling problems. Therefore the question of possibilities to predict the core assembly behaviour is essential.
For core monitoring and surveillance a reactor physics computer system will be installed; an important part is the history data file with the main task to collect all core assembly relevant facts during operation.
These are

- instrumentation signals from the core
- results of the nuclear core model
- design and fabrication data
- post irradiation examination results and generally derived limits.

Hence - in completion to the sophisticated design - the consistent data file based on operational results and subsequent consequent evaluation represents a preventive measure to avoid handling problems.

SNR 300 Preventive Measure Concept for Avoiding Handling Problems

Core Monitoring & Surveillance System



Design/Fabrication

- mechanical and thermal hydraulics design concerning the
  - . global core structure
  - . core assembly temperature distribution
  - . assumed dpa accumulation
  - . assembly distortion/growing

- material/fabrication-specification
  - . duct
  - . cladding
  - . spacer
  - . tolerance

- material charge

- fabrication data
  - . text & examination data
  - . tolerances
  - . particularities at fabrication

- limits

  evaluation of precursory data derived from material test programs and other plant experience

Process/Model

- o core instrumentation
  - . temperature (core assembly outlet)
  - . mass flow (core assembly on representative locations)
  - . neutron flux
  - . thermal power

- o nuclear model on a 3 D basis
  - . power distribution
  - . temperature distribution
  - . burnup distribution
  - . neutron flux distribution as a function of neutron energy
  - . dpa distribution

- o other plant data generating power history
  - . reactortanktemperature
  - . control rod axial position
  - . sodium-purity conditions

- o limits