framatome

ADVANCED REACTOR DESIGN AND SYSTEMS INTEGRATION CAPABILITIES

Advanced Reactor Competency Center & Design School

Framatome design and systems engineering skills to address all your advanced reactor development needs

Innovative Design Management Protocol

Implement modern and innovative aids to monitor/support/manage design and integration for advanced reactor projects

- System engineering (SE)
- Concurrent engineering (using GEEGLE)
- Architecture & trade-off management
- Agile design sequences
- Creativity session management
- Building information modeling (BIM) using REVIT™
- Plant life management (PLM)
- Early prototyping: Fab Lab, virtual reality
- Safety data base (SFDB)
- Design to cost (DTC)
- Design for manufacturing (DFM)

Operation, Inspection, Maintenance & Dismantling

Consider/include lifecycle aspects (aging monitoring and decommissioning plan) during design phase

- In-service inspection & repair (ISIR)
- Dismantling

Your performance
is **our** everyday **commitment**

Reactor Design & Integration

Equipment/system/component design and integration including nuclear requirements (refer to Licensing & Code section)

- Fuel
- Core
- Reactor architecture & integration
- Components (e.g., vessel, steam generator, heat exchanger, pump, drive rod)
- Safety systems
- Material expertise (carbon & stainless steel, graphite)
- Safety approach & evaluation

Advanced Methods & Digital Tools

Advanced/innovative/evolutionary computing models for more realistic and quicker development and analysis

- A.I. & metamodels generation (ADAGOS)
- Digital twin
- FAST CFD
- 2MF3D (3D fire analysis)
- SEISMIC TOOL BOX
- GHOST (advanced modeling of damping specific to sliding structures)
- 3D atmospheric release model/analysis
- VICTORIA (unique graphical user interface for several radiation propagation solvers)
- Design space exploration tools

Out-of-Reactor Nuclear Island Design & Integration

Design and integration of all equipment/systems/structures/components outside the reactor for advanced reactor projects

- Fuel handling
- Fuel storage (new and used)
- Hot cells
- Cask for handling fuel or component
- NI architecture & integration
- Utilities
- External containment
- Fire protection
- Auxiliary systems
- Safety analysis (internal and external)

Licensing & Code Compliance

Comprehensive safety approach for advanced reactors based on evolutionary and adaptive nuclear codes

- Safety methodologies & analyses
- Safety assessment reports (PSAR, FSAR)
- Probability safety assessments (PSA)
- Codes & standards: RCC-MRx, RCC-M, RCC-E, RCC-F, RCC-CW, ASME

Advanced/Gen4 Reactor References

Sodium Fast Reactor

- Phenix (PHX)
- Superphenix (SPX)
- Superphenix 2 (SPX2)
- European Fast Reactor (EFR)
- Sodium Fast Reactor (SFR)
- ASTRID

Accelerator-Driven System Reactor

- MYRRHA

High-Temperature Reactor

- HTR-Module
- ANTARES
- SC-HTGR

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