

Irradiation Behavior of Materials

Monitoring and Assessment

Safety and long-term operation by comprehensive assessment of materials behavior depending on operation time and neutron irradiation in power and research reactors

Challenge

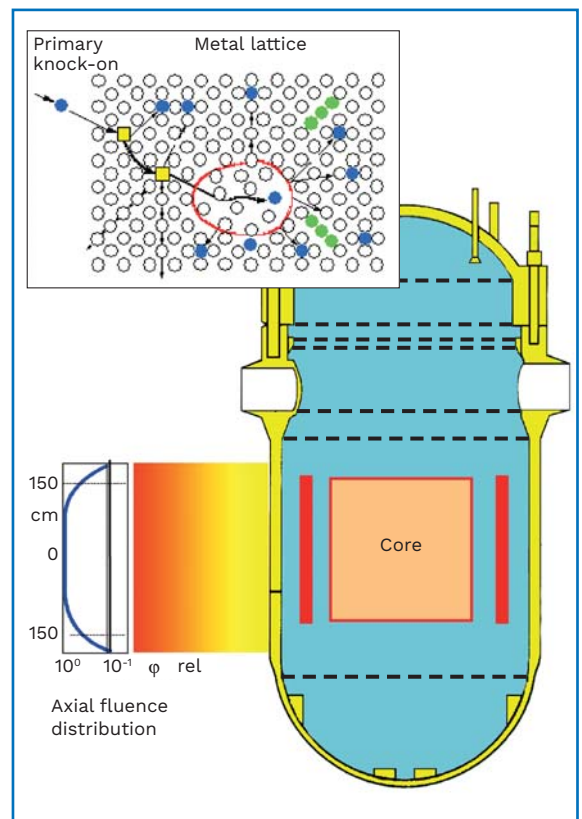
Plant lifetime management requires qualified monitoring and assessment of the aging behavior of irradiated nuclear components. This implies the need for conceptual planning, coordination, technical execution and final evaluation of irradiation surveillance programs in close collaboration with inspection bodies and nuclear authorities.

Solution

Framatome provides the full scope of irradiation surveillance programs for reactor pressure vessels (RPV) in light water reactors (LWR) and for components in research reactors. We support you with specific services such as conceptual consulting for plant life extension measures, theoretical and experimental determination of neutron fluence and qualified manufacturing of reconstituted specimens from irradiated specimen materials. State-of-the-art facilities and highly skilled and experienced staff are always at your service.

Customer benefits

- Strong partner with extensive experience in the field of aging management of nuclear components
- Short reaction times even for complex tasks
- Integrated solution competence from one single source
- All manufacturing and testing activities can be performed on site in certificated and accredited laboratories including material testing, hot cells and radiochemistry
- Good knowledge of requirements of inspection bodies and nuclear authorities



RPV: Change of material behavior under irradiation

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

Technical information

Turnkey irradiation surveillance programs for RPV in LWR:

- Consultation, planning, coordination and execution
- Close collaboration with independent experts and authorities
- Manufacturing of specimens and capsules
- Baseline testing
- Delivery of capsules to the power plant
- Withdrawal of capsules from the RPV
- Post-examination of irradiation capsules
 - Transport to the hot cells test lab
 - Dismantling of capsules and specimen testing
 - Examination of temperature and fluence monitors
 - Fluence calculations
 - Final assessment of results, documentation of the entire project, compilation of the necessary documents for license applications

Specific services such as:

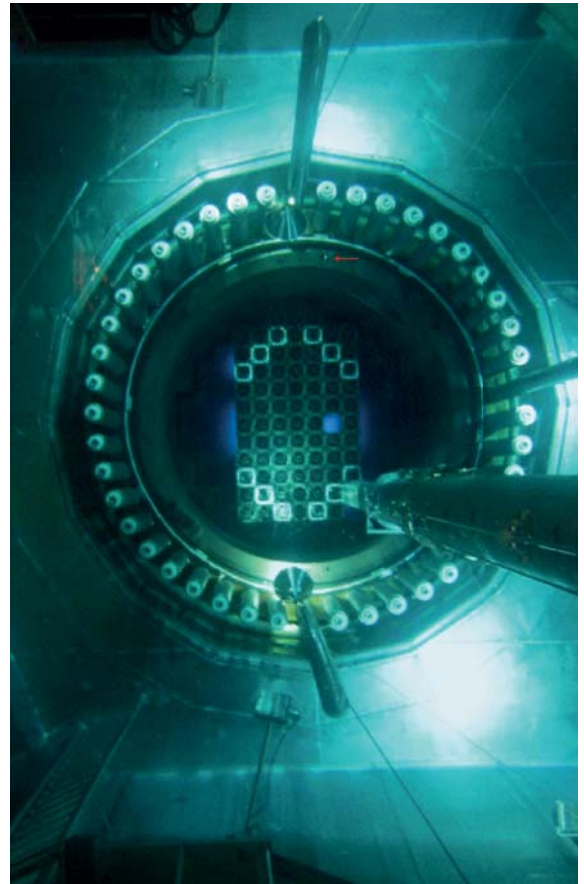
- Removal and examination of scraping samples from the austenitic RPV cladding
- Conceptual consulting for plant life extension and mitigation measures
- Qualified manufacturing of reconstituted specimens from irradiated specimen materials

Monitoring and assessment of irradiation behavior of other nuclear components:

- Irradiation surveillance programs for research reactors
- Assessment of irradiation behavior of Al-Mg alloys and of austenitic materials

Additional services offered by our competence center:

- Mechanical testing of unirradiated material
- Structural integrity assessment of the components concerned in terms of fracture mechanics (pressure-temperature limit, pressurized thermal shock, flaw assessment)



RPV

Key figures

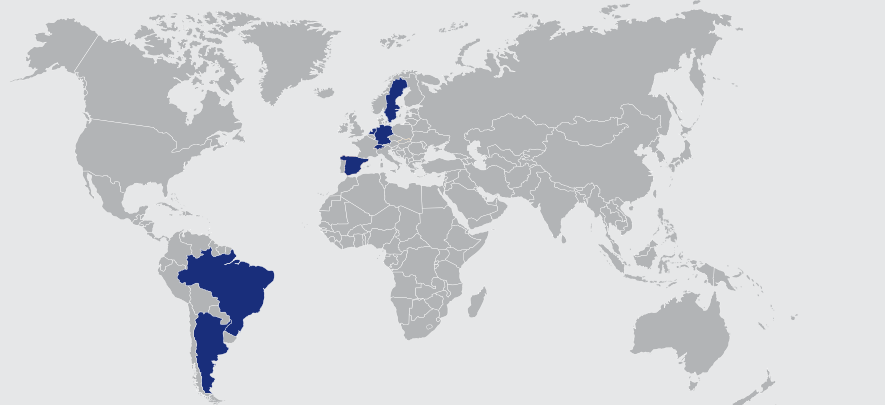
60 years experience in assessment of irradiation behavior of reactor materials

More than **100** irradiation capsules manufactured and tested

References

Plants worldwide (number):

- Argentina (1)
- Brazil (1)
- Switzerland (4)
- Netherlands (1)
- Sweden (1)
- Spain (2)
- Germany (21)
- Research reactors (2)



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