

# **International Conference on Topical Issues in Nuclear Installation Safety: Strengthening Safety of Evolutionary and Innovative Reactor Designs**



**Tuesday, 18 October 2022 - Friday, 21 October 2022**

**Vienna**

## **Themes and Topics**

The main theme of the Conference is the safety of evolutionary and innovative reactor designs, which implies covering the wide range of related topics, from applicability of current safety approaches to these reactors, their design safety and safety assessment issues as well as utilization of advanced modelling tools and experiments.

## **Topic 1. Applying safety approaches and standards for evolutionary and innovative reactor technologies**

- Regulatory experiences in licensing or preparation for licensing of innovative reactor technologies
- New regulatory approaches for licensing of innovative reactor technologies (regulations, new safety approaches, revision of current frame)
- Application of current safety standards and regulations to the design assessment of innovative technologies (good practices, experiences, identified gaps and non-applicability)
- International cooperation: harmonisation of safety standards and guidance for innovative reactor technologies and sharing of regulatory reviews
- Holistic approach to safety, security and safeguards for innovative reactor technologies (safety-security-safeguards organizational interfaces and related challenges)
- Fusion power plant design safety requirements and licensing.
- Capacity building on safety of innovative reactors

## **Topic 2. Enhancing safety by innovative design features**

- Safety by design: defence in depth implementation in innovative reactors.
- Advanced nuclear fuels: design, operation, qualification and back-end conditioning for recycling or disposal.
- Design safety challenges for non-water cooled reactors (e.g., containment, coolant, fuel, chemistry, radiation protection)
- Innovative structural materials
- Safety-security-safeguards by design
- Codes and standards for non LWRs
- Inherent safety features of reactor cores
- Passive safety design options.
- Advanced instrumentation and controls and human-machine interfaces.
- Application of general design requirements: safety classification, design/protection for internal and external hazards, etc.

## **Topic 3. Supporting integrated decision making through safety/risk analyses**

- Trends in deterministic safety analysis for evolutionary and innovative reactor designs (determination of PIEs, acceptance criteria, approaches, internal and external hazards)
- Trends in probabilistic safety assessment for evolutionary and innovative reactor designs (multi-unit/multi-module risk, risk-informed applications, risk communication, internal and external hazards)
- Integration of deterministic and probabilistic approaches for decision making
- Analysis of design extension conditions and demonstration of margins to cliff-edge effects

- Analysis of conditions to be practically eliminated
- Analytical support of accident management of innovative reactors Safety demonstration utilizing operational experiences
- Integrated risk-informed decision making (deterministic/probabilistic considerations, organisational aspects, security interfaces, cost benefit analysis and economic factors)

## **Topic 4. Accelerating innovations for safety assessment through the advanced simulation and modelling, and experimental programmes**

- Application of advanced modelling techniques for assessing safety performance of the evolutionary and innovative reactors
- Development of advanced multi-scale , multi-physics methods applicable to safety analysis of evolutionary and innovative reactor designs
- Experimental facilities and programmes to support demonstration of evolutionary and innovative reactor designs (safety, instrumentation, ....)
- Use of innovative solutions in advanced modelling and simulation (artificial intelligence, big data processing, robotics, machine learning,....)
- Developments of nuclear power plant simulators and part task simulators demonstrating safety features of evolutionary and innovative reactor designs
- Innovations in and lessons learned from trainings (especially virtual) on advanced simulation and modelling tools