Contribution ID: **85** Type: **Poster**

ENEA experience on Small Modular Reactors (SMRs)

Today there is a growing interest for light water SMRs due to the evolutionary modifications introduced in comparison with large LWRs, such as lower core power, compact design and use of passive safety systems (PSSs). In this framework, ENEA has been involved in the last two decades in several activities to support the development of this technology, leading experimental campaigns and computational activities in order to fill the knowledge gaps related to the design and operation of PSSs. In fact, if on one side PSSs increase the inherent safety of the plant due to the reinforcement of DiD levels, on the other side, PSSs are characterized by less operating experience and by the possibility of functional failure related to the thermal-hydraulics of natural circulation. Therefore, the development of experimental data and the consequent code validation against them is fundamental to assess the reliability of PSSs. The target of this paper is to show the main activities recently developed in ENEA, in relation to the characterization of PSSs operation, in term of experimental campaigns (e.g. PERSEO Benchmark, within European Project ELSMOR), code validation (e.g. within the European Project PASTELS) and reliability assessment through the application and development of the REPAS methodology.

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Track Classification: Topical Group C: Safety, Security and Safeguards: Track 8: Demonstrating SMR's Safety Case