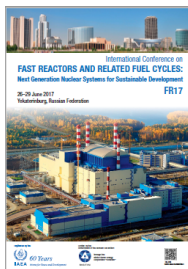


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## The core of the LFR-AS-200: robustness for safety

*Tuesday 27 June 2017 17:30 (1h 30m)*

The LFR-AS-200 is a 200 MW(e) Lead Fast Reactor (LFR) standing on simplicity to target the objective of representing a commercially viable option for an innovative Small Modular Reactor (SMR). To fulfil its envisaged role, which is particularly meaningful for multi-units sites, the design has to enhance the safety performances; this is achieved by exploiting the relevant favourable intrinsic properties of lead, and by implementing engineered features, passively operating to permit a robust response of the system even in challenging beyond-design accidental conditions resulting as a consequence of multiple failures of the reference lines of defence.

The design of the core is here presented with a particular emphasis on the encompassed safety provisions, both intrinsic and engineered. Notably, the largely negative reactivity coefficients of the core will be presented along with a passive provision enhancing the flowering of the core, thereby the anti-reactivity insertion upon transients resulting in an increase of the core outlet temperature. The performances of the system in two main unprotected transients –a transient of over-power and a combined loss of flow-loss of heat sink –are finally presented. The results prove the effectiveness of the design to withstand such challenging conditions and to ensure extremely large grace times for actuating countermeasures without incurring in the failure of any of the first two engineered barriers for the confinement of radioactivity –the fuel cladding and the primary circuit boundary –thereby protecting not only the environment and the population, but also the investment itself.

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