

## **Development of a 150 MWe LMR Conceptual Nuclear Design with Breeding Characteristics**

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### **Abstract**

*A 150 MWe breeder core planar layout for assuring an economic and safe operation has been developed by equilibrium cycle searches. The fuel cycle analysis was performed in the equilibrium cycle, consisting of external feed fuel with reprocessed typical PWR spent fuel and fissile makeup with recycled Pu. With a few iterations on several candidate core layouts, a reference breeder core of radially heterogeneous configuration has been established. The KALIMER breeder core configuration was developed along with some degrees of optimization subject to the constraint that it approximately fits into the geometric and thermal-hydraulic envelopes similar to the former uranium metallic fueled core. The KALIMER breeder core has an average breeding ratio of 1.18 and maximum discharge burnup of 116.9 MWD/kg. The neutronics performance characteristics obtained from the equilibrium cycle analysis show that the KALIMER breeder core would work safely as well as economically, achieving the design goal of high breeding ratio under the design criteria.*