

## **ABSTRACT**

### ***Design of Supercritical Cooled Water Reactor with Uranium-Thorium Fuel Cell Core Silinder Model***

***By***

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*The research of desain of Supercritical Cooled Water Reactor (SCWR) uranium-thorium fuel silinder model has been done. The objective of this research is to obtain the design with high thermal power and inherent safety features. The analyzed parameters were: core fuel enrichment, reactor size, criticality, and power density distribution. A core calculation of column x and row y was achieved by CITATION code. Fuel composition and core configurations in critical condition were calculated by variation of fuel enrichment, reactor size and configuration of the fuel in the core. SCWR used uranium-thorium as fuel, stainless steel as cladding, light water as moderator and coolant as well. This research obtained critical core design that is size  $x = 340$  cm, and  $y = 170$  cm. The critical condition can be achieved when the fuel first region loaded about 3.1704% fuel enrichment, fuel second region 2.5% fuel encrichmant and fuel third region 4% fuel encrichmant. The design produced 1000 M W thermal power, the maximum power density is 114,4073 watts/cm<sup>3</sup> and k-effective value is 1.000006. The reactor core in this research fulfills the inherent safety standard in term of neutronic aspect.*

**Keywords :** Core design, SCWR, uranium, thorium, power density