ABSTRAK

PERHITUNGAN *BURN UP* MODEL *ASSEMBLY* X-Y 2 DIMENSI PADA SCWR MENGGUNAKAN BAHAN BAKAR THORIUM

Oleh

Arizka Antartika Putri

Penelitian tentang perhitungan *burn up* model *assembly* x-y 2 dimensi pada SCWR menggunakan bahan bakar thorium. Perhitungan dilakukan dengan simulasi komputasi menggunakan kode ASMBURN pada program *System Reactor Atomic Code* (SRAC). Parameter yang dianalisis pada penelitian ini meliputi pengayaan bahan bakar, radius pin bahan bakar, densitas daya, produksi bahan bakar yaitu uranium-233, uranium-235 dan plutonium-239, penambahan *burn up*, dan perubahan daya linear. Hasil perhitungan menunjukkan pengayaan yang ktitis terdapat pada pengayaan 3%, radius pin bahan bakar sebesar 0,434 cm, selongsong 0,489 cm, dan moderator 0,640 cm. Nilai densitas daya menurun sebesar 0,00798% seiring pertambahan *burn up*. Nilai densitas atom pada produksi bahan bakar uranium-233 mengalami penurunan sebesar 40,77%, sementara itu densitas atom uranium-235 dan plutonium-239 mengalami kenaikan.

Kata Kunci : *burn up*, SCWR, thorium, uranium, $k_{\text{eff.}}$

ABSTRACT

BURN UP CALCULATION OF X-Y 2 DIMENSIONAL ASSEMBLY MODEL IN SCWR USING THORIUM AS FUEL MATERIALS

By

ARIZKA ANTARTIKA PUTRI

Research about study of burn up calculation of x-y 2 dimensional assembly model in SCWR using thorium as fuel materials has been done. The calculation was performed by using simulation computation ASMBURN code in System Reactor Atomic Code (SRAC) program. The analyzed parameters were fuel enrichment, fuel pin radius, power density, fuel production of uranium-233, uranium-235, and plutonium-239, increasing burn up level, and linear heat changed. The calculation results showed that critical condition of reactor at 3% of enrichment, 0.434 cm of fuel pin radius, 0.489 cm of cladding, and 0,640 cm of moderator. Due to power density decreased about 0.00798% by increasing burn up. Atomic density of uranium-233 decreased about 40.77%, uranium-235 and plutonium-239 were increased.

***Keywords**: burn up, SCWR, thorium, uranium,* $k_{\text{eff.}}$