ABSTRAK

DESAIN TERAS REAKTOR *HIGH TEMPERATUR GAS-COOLED REACTOR* (HTGR) MODEL *MESH TRIANGULAR* DUA DIMENSI BERBAHAN BAKAR THORIUM BERPENDINGIN GAS CO_2

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Penelitian tentang desain teras reaktor *High Temperature Gas-cooled Reactor* (HTGR) dengan model *mesh triangular* dua dimensi berbahan bakar thorium berpendingin gas CO_2 telah dilakukan. Penelitian ini bertujuan untuk mendesain teras reaktor HTGR agar diperoleh kondisi kritis dan daya termal yang maksimal. Perhitungan dilakukan dengan menggunakan kode CITATION program SRAC pada 1/6 bagian permukaan teras reaktor HTGR. Parameter yang dianalisis meliputi persentase pengayaan bahan bakar, ukuran dan konfigurasi teras reaktor, harga kekritisan dan rapat daya. Hasil yang diperoleh menunjukkan desain teras reaktor HTGR yang ideal dengan ukuran kolom (x) 202 cm dan baris (y) 101 cm. Persentase pengayaan bahan bakar bagian pertama sebesar 3% dan bahan bakar bagian kedua 2,731%. Desain teras reaktor ini menghasilkan daya termal sebesar 100 MWth, rapat daya maksimal sebesar 107,5371 watt/cm^3 dan nilai *k*-efektif 1,000008.

Kata kunci: Desain reaktor, HTGR, thorium, rapat daya.

ABSTRACT

DESIGN OF REACTOR HTGR CELL CORE WITH TWO DIMENSIONAL TRIANGULAR MESH MODEL USING THORIUM FUEL AND CO$_2$ GAS COOLANT

By

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The research of design reactor HTGR cell core with two dimensional triangular mesh model using thorium fueled and CO$_2$ coolant has been done. Objective of the research was design critical condition of HTGR cell core so as obtained critical condition and high thermal power. The neutronic analyzed by CITATION of SRAC on 1/6 of reactor cell core. The parameter which analyzed were core fuel enrichment, size and configuration reactor cell core, critically and power density. The result was obtained the ideal reactor design with size (x) 202 cm and (y) 101 cm. The enrichment of first region was 3% and second region was 2.731%. The total thermal power of reactor was 100 MWth, maximum power density of reactor was 107.5371 Watt/cc and k$_{eff}$ of reactor was 1.000008.

Keywords: Core design , HTGR, thorium, power density.