DESIGN OF AN EPR BLANKET†

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Summary

A blanket concept is presented which meets typical requirements anticipated for an Experimental Power Reactor. Design alternatives are reviewed. One-dimensional neutronic and thermal hydraulic results are presented for the ORNL reference design. Design consideration was given for remote maintenance and assembly requirements. Modifications of the reference design first wall are necessary because of high thermal stresses.

Preliminary Scoping Studies

The EPR blanket design presented here is the result of a scoping study conducted at Oak Ridge National Laboratory in FY75.[1] This study included an investigation of seven different blanket concepts. Each concept was evaluated as to (1) fabricability, (2) temperature distribution, (3) coolant manifolding, (4) inner wall cooling, (5) power limitations, (6) material availability, (7) coolant pumping power, (8) breeding gain, and (9) tritium recovery. TYPE 316 stainless steel was assumed as the structural material for all designs. No consideration was given to refractory metals as there seemed little likelihood that ~~these~~ THEY would be available for use ~~by 1985-89, in the quantities or complex geometries necessary for the EPR~~ IN TIME FOR APPLICATION IN THE EPR.

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