

FEASIBILITY STUDY OF SMALL LONG-LIFE WATER COOLED THORIUM REACTORS (WTRS) FOR PROVIDING SMALL QUANTITY OF ENERGY DEMANDS

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ABSTRACT

A small scale, 30 ~ 300 MWth, of water cooled thorium reactor (WTR) is intensively investigated for supplying small quantity of energy demands in many remote and less developed areas of some developing countries. To provide suitable design for the areas, the reactors should have good design features. In the present study, both small-size and long core life features are chosen to be basic design goals of the reactors. Water cooled reactor type is used as a basic investigation design because it is a good proven nuclear power reactor technology. Thorium is introduced in this study to achieve some merits, such as higher conversion ratio and higher discharge fuel burnup compared to uranium fuel to provide basic characteristic for achieving good small long life reactors performances. The investigation covers some important parameters, i.e. enrichment, moderator to fuel ratio, discharge fuel burnup (*physics* aspect); and coolant void reactivity coefficient (*safety* aspect).