

REACTIVITY CONTROL OPTION FOR DUPIC FUEL BY NATURAL URANIUM

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ABSTRACT

In DUPIC fuel cycle, the spent pressurized water reactor (PWR) fuel is refabricated as a DUPIC fuel by a dry process. However, because the spent PWR fuel composition depends on the initial enrichment and burnup condition of the PWR fuel, the composition of a DUPIC fuel is not uniquely defined. Therefore, the composition adjustment methods of DUPIC fuel have been studied for the purpose of reducing the effects of composition heterogeneity on core performance parameters. This study focuses on the reactivity control method which uses natural uranium feed to minimize the effect on the manufacturing cost of DUPIC fuel when adjusting the excess reactivity of spent PWR fuel. The results of this study have shown that the reactivity of DUPIC fuel can be controlled tightly by feeding natural uranium to the spent PWR fuel mixture. However, the advantage of using natural uranium to reduce the manufacturing cost is relatively small considering the fuel cycle cost penalty caused by the discharge burnup decrease.