

Sensitivity of DUPIC Fuel Fabrication Cost to the use of Fresh Uranium

Won Il Ko, Hangbok Choi and Myung Seung Yang
Korea Atomic Energy Research Institute
P.O. Box 105, Yusong, Taejon, Korea

ABSTRACT

A preliminary conceptual design of a direct use of spent pressurized water reactor (PWR) fuel in Canada deuterium uranium (CANDU) reactors (DUPIC) fuel fabrication plant was studied, which annually converts PWR spent fuel of 400 MTHE into the CANDU fuel. The capital and operating costs were estimated from the viewpoint of conceptual design. Assuming that the annual discount rate is 5% during construction (5 yr) and operation period (40 yr) and contingency is 25% of the capital cost, the levelized unit cost (LUC) of DUPIC fuel fabrication was estimated to be 616 \$/kgHE. For new DUPIC fuel option which utilizes fresh uranium to maintain the composition homogeneity, the levelized unit cost of DUPIC fuel fabrication was estimated to be 654 \$/kgHE. It should be noted that this study has used representative costs of currently available technologies as the bases of cost estimation. It is recommended that further studies should be performed on other areas such as safety, security, safeguards, process optimization etc