Impact of Thorium Recovery Fraction on Long Term Radio-Toxicity of a Thermal Spectrum System High Level Waste

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Abstract

The paper examines the use of thorium-bearing fuel in a thermal spectrum system with reprocessing. Due to inherently reduced generation of higher actinides, thorium has well-known potential to reduce the long-term radiotoxicity of nuclear waste. Most of such analyses assume a relatively high recovery fraction (e.g., 99% or 99.9%), similar to that expected in UREX-type processes. However, Thorex or other separation processes considered for thorium-bearing fuel may in fact have a significantly lower recovery fraction. This paper examines the impact of the reduced recovery and different partitioning schemes (with respect to Np and Pu) on the radio-toxicity of actinide inventory in high level waste generated by thorium-bearing fuel.