

Use of Thorium-fuelled LWRs to Manage the UK's Plutonium Stockpile

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The UK possesses a stockpile of separated plutonium in excess of 100 tonnes. The currently favoured management strategy is to use the plutonium in uranium-plutonium (U-Pu) mixed-oxide (MOX) fuel. Use of thorium-plutonium (Th-Pu) MOX may lead to fuel performance and fuel cycle advantages. In particular, recent research indicates that Th-Pu MOX may be well suited to act as the first stage of a full actinide recycle scheme in reduced-moderation LWRs, as a near-term and potentially cheaper alternative to fast reactors.

In this project the neutronic and thermal-hydraulic feasibility of Th-fuelled reduced-moderation LWRs will be assessed. The fuel cycle performance of future nuclear fuel cycle options utilising Th-Pu MOX fuel, including disposal after a single recycle and full recycle in reduced-moderation LWRs or fast reactors, will be analysed and compared to options based on U-Pu MOX or direct Pu disposal. The cost and value of future fuel cycle options utilising Th-MOX relative to once-through and U-MOX strategies will be evaluated.