Time to tackle the UK's plutonium mountain

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Professor Neil Hyatt, Research Chair in Radioactive Waste Management, calls for UK plutonium policy to be re-examined to allow swift immobilisation of UK's civil plutonium stockpile to maximise safety, security and affordability for UK taxpayers.

Plutonium was once envisaged as the fuel for a fleet of fast breeder reactors, but the reactor development programme was shelved in 1994. Since then, plutonium, recovered by reprocessing of nuclear fuel, has continued to stockpile at the Sellafield site.

At the end of reprocessing operations in 2020, the UK civil plutonium stocks will exceed 140 tonnes - the largest stockpile of plutonium under civil safeguards in the world. Several influential reports have highlighted security concerns associated with indefinite storage of this material.

Current Government policy is to reuse the UK's plutonium as so-called MOX (Mixed Oxide) fuel in a fleet of new light water reactors. However, an analysis of the troubled US MOX Fuel Fabrication Facility, conducted by Professor Neil Hyatt, Director of Sheffield's Immobilisation Science Laboratory, has identified issues that may also be problematic for a potential new UK MOX fuel production plant.

The USA has all but abandoned completion of its MOX Fuel Fabrication Facility, a cornerstone of the Plutonium Management and Disposition Agreement between the USA and Russia, signed in 2010, to eliminate 34 tons of weapons grade plutonium. This lead to Russia suspending implementation of the agreement in October 2016.

Writing in the journal *Energy Policy*, Professor Neil Hyatt argues "The heavily over budget and delayed US MOX Fuel Fabrication Facility is based on the same reference design as a potential UK plant. So there is an urgent need to review the design basis assumptions and cost data for a UK MOX fuel fabrication plant, in the light of the US experience".

Professor Hyatt adds "In addition, no owner of a future new nuclear reactor in the UK has yet given a commitment to accept MOX fuel and the commercial appetite is expected to remain weak. For example, the Generic Design Assessment for the Hinkley Point C reactors explicitly excluded consideration of MOX fuels".

The study concludes Government policy should be changed to commit to immobilising plutonium which is suitable for reuse as MOX fuel, in the event that a MOX fuel fabrication plant is no longer considered a viable proposition.

Professor Hyatt argues that the UK needs to learn the lessons of the US plutonium disposition programme, which was wedded, exclusively, to plutonium reuse in MOX fuel fabrication: "There are significant cost and technical uncertainties in both the MOX reuse and immobilisation and disposal options. We can only mitigate these uncertainties by making a commitment to promptly immobilising all plutonium which is not reused as fuel and developing the necessary technology".

More information: Neil C. Hyatt, Plutonium management policy in the United Kingdom: The need for a dual track strategy, *Energy Policy* (2016). DOI: 10.1016/j.enpol.2016.08.033

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