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LOW OR HIGH-ENRICHED URANIUM FOR A NASA NUCLEAR POWER SYSTEM?

Abstract

The National Aeronautics and Space Administration has expressed a renewed interest in the development and deployment of nuclear power systems for use in outer space. The most immediate application being to power a potential human habitat nestled within the permanently shadowed regions of the Lunar south pole. The administration is weighing its options on the choice of Uranium enrichment to be used as reactor fuel, with highly enriched uranium (20

The high-enriched Uranium design is most promising in terms of its technical performance, however it lacks in other areas when compared to a low-enriched design. The risk of increased proliferation and the political consequences of using highly-enriched fuel is likely to result in significant international and domestic backlash. Furthermore, despite being of lower mass, the highly-enriched design will increase costs due to tighter security and certification requirements. It will also diminish the agencies ability to interact with the commercial sector to develop reactor technology through mechanisms such as public-private partnerships. We recommend that NASA strongly consider these broader implications when finalising design choices for their nuclear power system technology.