The evolutionary adoption of thorium beginning with its application in niche LWR fuels

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Since the inception of nuclear energy, the use of thorium as a nuclear fuel has been envisioned. Thorium boasts benefits, however, drawbacks which are both economic and technical including its the lack of a naturally occurring fissile isotope implies that its utility is inherently more difficult. The implementation of thorium as a nuclear fuel requires that it must provide sound technical advantages in combination with attractive economics as compared to standard uranium fuel. Revolutionary thorium concepts such as molten salt reactors and accelerator driven systems may provide theoretical merit, however, their exotic nature and associated technical challenges label them as long-term solutions at best. A near-to-medium term solution for thorium must be based on an evolutionary approach utilizing light/heavy water reactor platforms. While thorium does not provide a near-to-medium term complete replacement of uranium, it does provide substantial benefit within niche applications. To license and bring to market these niche fuels, Thor Energy and an international consortium of entities (including: Fortum, KAERI, Westinhouse, NNL, ITU, IFE, and a few other minor entities) have initiated a fuel development and irradiation test program to characterize the performance of these thoria-containing fuels.

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Dr. Saleem Drera earned two B.S. degrees in Nuclear Engineering and Chemical Engineering from the University of California Berkeley, an M.S. in Mechanical Engineering from the University of Colorado, and a PhD in Nuclear Science and Engineering from the Colorado School of Mines. He currently servers as the V.P. of Research and Development for Thor Energy where his work is primarily focused on the development and testing of thorium based light water reactor fuels. Specifically, his current research focuses on the commercial manufacturability of thorium based oxide fuels. In the past, he has held positions with Argonne National Laboratories (ANL) in the RERTR sector of the Nuclear Fuels Department and Knolls Atomic Power Laboratory (KAPL) in the Spent Fuels department.