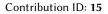


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## Fuel burnup calculations for current LEU fuel and converted HEU fuel for the Nigerian Research Reactor-1 (NIRR-1) using the WIMS-ANL computer code

Wednesday, 16 November 2022 11:00 (30 minutes)

The fuel depletion analysis of the NIRR-1 core was performed, and the results were consistent with the literature for the HEU core for similar calculations using different methods, indicating that WIMS-ANL AND REBUS-ANL can be considered a reliable tool for estimating the fuel burnup of a potential LEU core. According to the provided actinide inventory, approximately 1% of the initial U^235 loading of the HEU core has been depleted, and the percentage burnup of the HEU core was higher than the LEU core for the same period of reactor operation. As a result, the LEU core will continue in service for a longer period of time before being replaced. The accumulation of fissile ⊠Pu⊠^239 and ⊠Pu⊠^241is insufficient to compensate for the loss in reactivity caused by U^235 depletion, and the concentration of ⊠Pu⊠^239in spent fuel is insufficient to raise concerns about nuclear weapon design and production.

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