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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

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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  $^{239}\text{Pu}$  and  $^{241}\text{Pu}$  is insufficient to compensate for the loss in reactivity caused by  $U^{235}$  depletion, and the concentration of  $^{239}\text{Pu}$  in spent fuel is insufficient to raise concerns about nuclear weapon design and production.

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