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**Preparations for Shipment of Irradiated HEU Nuclear Fuel from
Nigeria to China**

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ABSTRACT

Preparations have been made for the repatriation of the Nigerian Research Reactor 1 (NIRR-1) irradiated highly-enriched uranium (HEU) nuclear fuel core to China. This effort has been conducted with the support of the International Atomic Energy Agency (IAEA), the China Institute of Atomic Energy (CIAE), and the U.S. Department of Energy (DOE) National Nuclear Security Administration's (NNSA) Office of Material Management and Minimization (M3). The NIRR-1, which is a Miniature Neutron Source Reactor (MNSR) type, is operated by the Center for Energy Research and Training (CERT) of the Nigerian Atomic Energy Commission (NAEC) and is located at the Ahmadu Bello University in Zaria, Nigeria. MNSRs were designed and built by CIAE and are located in China, Ghana, Iran, Nigeria, Pakistan, and Syria

The NIRR-1 HEU removal process involved upgrades to the facility to support the shipment process, as well as development of licensing and packaging for the handling of the irradiated HEU nuclear materials. The HEU core will be transferred from the NIRR-1 facility using a shielded transfer cask and will then be packaged in the TUK-145/C transport package, which provides shielding and protection for the HEU core during transport to China. Following importation into China and unloading, the irradiated core will be placed into interim storage. The present paper describes the details of the preparations for this shipment and the lessons learned.