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Nuklear Malaysia Mobile Hot cell Facility: Enhancing Transportation Security of High-Activity Radioactive Sources

The secure transport of Spent High-Activity Radioactive Sources (SHARS), particularly those contained within disused industrial and medical equipment such as irradiator and teletherapy units represents a critical and pervasive challenge to global nuclear security. The unauthorized access to or malicious use of SHARS during transit poses a significant radiological and security threat. Addressing this imperative, the Malaysian Nuclear Agency (Nuklear Malaysia) has pioneered the development and deployment of a Mobile Hot Cell (MHC) Facility dedicated to the safe and secure end-of-life management of SHARS. This paper presents a comprehensive analysis of the Nuklear Malaysia MHC Facility, focusing on its design, operational methodology, and pivotal role in strengthening the security of SHARS transportation. The MHC is a highly shielded, relocatable containment system engineered to perform remote handling, dismantling, conditioning, and secure packaging of SHARS into certified transport and storage containers known as Long-Term Storage Systems (LTSS) at the source owner's site. This on-site conditioning capability eliminates the high security risks associated with transporting unconditioned, bulky, and often vulnerable equipment containing SHARS over long distances to a disposal waste facility. The methodology adopted includes a detailed discussion of the structural integrity, shielding performance, remote operation mechanisms, and the rigorous Quality Management System (QMS) established for the MHC operation, which was developed in collaboration with the International Atomic Energy Agency (IAEA). The paper concludes that the Nuklear Malaysia MHC Facility is a vital national asset significantly mitigating the security risks of SHARS by facilitating their safe transfer from insecure operational environments into secure, robustly shielded transport and storage packages. Its implementation enhances compliance with international security recommendations and sets a new standard for a secure, flexible, and responsive approach to the cradle-to-grave management of high-risk radioactive material.

Country or International Organization

Instructions

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