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Sustainable management of disused sealed radioactive sources (DSRSs) in Malaysia: Borehole disposal

Effective and safe management of disused sealed radioactive sources (DSRSs) is essential in ensuring sustainability in radioactive waste management particularly in countries without extensive nuclear power program like Malaysia. Malaysia is adopting borehole disposal as an approach to wisely and safely manage its Category 3-5 DSRSs and at the same time promoting sustainability of the environment and economy. The final disposal of the DSRSs managed to remarkably resolve most of the issues associated with the accumulation and storage of DSRSs that the country had been facing for the past 40 years. Longer-lived and higher radioactivity sources such as Am-241, Cs-137, Sr-90, Kr-85 and Co-60 were the main inventories disposed into the borehole. Post-closure safety assessment indicated that the borehole disposal facility is effective in providing safe solution for the disposal of the DSRSs, with a maximum dose rate of 10 magnitudes lower than public dose limit of 1 mSv/y received by human 450,000 years after the disposal. With its small footprint of approximately 300 mm, the borehole disposal resulted in low land usage and impact. During its construction, very minimal environmental intrusion and damage were involved. The borehole disposal system implemented contributes to circular economy not only in terms of reducing radioactive waste and its associated risks to human and the environment but also promoting other economic activities for example recycling of uncontaminated shielding parts for other applications. Additionally, the implementation of borehole disposal is more cost-effective than other disposal options for Malaysia that has limited amount of radioactive waste. Expertise and experience as well as resources such as the mobile tool kit facility (MTKF) acquired serve as invaluable long-term sustainable assets to be shared with other countries interested in the same purpose.

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