

Low-Cost Storage Option for Disused Radioactive Sealed Sources to Enhance End-of-Life Management



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Problem Statement

Lack of access to immediate removal or permanent disposition pathways for disused radioactive sealed sources may pose a concern to source owners, regulatory authorities, and the public. Due to their high activity and portability, these sources could be used for malicious purposes resulting in human harm, economic impact, and significant social disruption.

Once radioactive sealed sources become disused, the end-of-life management cycle begins. While safe and secure storage discussed herein is only a temporary measure, it is nonetheless an important step between end-of-use and final disposition. A means for permanent disposition is essential but may not be immediately available in many, if not most, cases.

Therefore, secure interim storage may be necessary, potentially for an extended period of time. In the absence of formal storage facilities, disused radioactive sealed sources may be placed in closets, transporters, sheds, basements, and other soft targets. Such unsecured storage locations pose a risk for both unintentional and intentional mishandling of sources.

It takes resources (time, funding, and personnel) for formal storage facilities to be conceived, designed, permitted, and constructed. Therefore an interim storage option may be necessary.

Unsecured Storage of Disused Sources



Interim Storage Option

- This system allows for on-site construction with the use of basic construction materials (concrete, lumber, etc.) and flexibility of final design to fit site needs. It is assumed the system will be exposed to environmental conditions and should be designed with a lifespan of up to 10 years.
- The security of the system focuses on forcible access delay to the stored material. The container must not be easily moved and may be partially buried. Material used must be destroyed to retrieve the sources.
- Materials and tools for the low-cost storage unit, along with designs, could be shipped within the steel container as a kit for on-site construction. The unit can be constructed by either in-country personnel or a deployed team.



Design and Construction

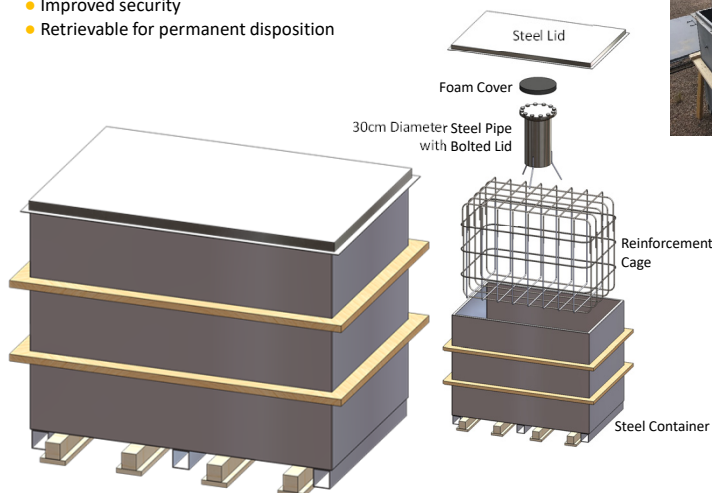
Considerations for proof-of-concept design and construction:

- Must not be easily moved
- Life-cycle of up to 10 years
- Concrete must be reinforced
- Source retrieval must be destructive

Ultimate Goal

In cases where expensive, fully-compliant storage infrastructure is unrealistic, the benefit of employing this low-cost storage option outweighs the risk of doing nothing (e.g., unintended radioactive exposures or intentional misuse). While not meant as a final solution, safe and secure interim storage is still vital to permanent threat reduction by emphasizing a cradle-to-grave policy on disused radioactive sealed sources and bridging the gap between end-of-use and ultimate disposition of disused radioactive sealed sources.

- Inexpensive deployment, operation, maintenance
- Improved security
- Retrievable for permanent disposition



Example Proof-of-Concept Demonstration Unit



Design: Plans for constructing the unit could be provided to in-country regulator or other responsible party.

Kit: The materials and tools (minus the concrete) for the low-cost storage unit, along with designs, could be shipped to the proposed construction location as a kit.

On-site construction: To eliminate concerns of insider threats, on-site construction can be provided by a team of qualified experts. Lack of knowledge of construction details can result in increased security. However, in-country patrols would still be needed.

Construction will take a team of three people approximately one week and may include:

- Preparing the storage location
- Fabricating rebar reinforcement cage
- Loading disused sources into steel pipe and closing bolted lid
- Placing steel pipe and reinforcement cage into steel container
- Pouring concrete
- Closing the steel lid



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