

Interim storage options for disused radioactive sealed sources to enhance end-of-life management

The Off-Site Source Recovery Program is a U.S. Government activity sponsored by the National Nuclear Security Administration Office of Radiological Security and managed at Los Alamos National Laboratory. The program mission is to remove, safely secure, and disposition excess, unwanted, or disused radioactive sealed sources that pose a potential risk to national security, public health, and safety.

The 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. During their useful service lives, radioactive sealed sources have numerous essential and beneficial uses in the fields of medicine, industry, construction, education, and research applications. However, due to their high activity and portability, some of these sources could be used, either individually or in aggregate, for malicious purposes resulting in economic impacts and significant social disruption. Examples of intentional misuse include radiological dispersal devices (RDDs), also called dirty bombs, and radiological exposure devices (REDs).

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 along the path between end-of-use and final disposition. A means for permanent disposition is essential but is unavailable in many 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 unfortunately be placed in closets, transportainers, sheds, basements, and other soft targets. Such unsecured storage locations pose a risk for both unintentional and intentional mishandling of sources. In some cases, the development of safe, easily constructible, and secure storage options at a minimal cost may be a viable option to prevent the loss or theft of disused radioactive sealed sources.

There are currently no adequate statistics on the number of disused radioactive sealed sources around the world, but the number may continue to rise due to increasing international deployment of radioactive sources in medical, agricultural, and industrial applications. Particularly in developing countries or remote areas, there may be a lack of formal secure storage facilities for disused radioactive sealed sources awaiting final disposition. It takes resources (time, funding, and personnel) for formal storage facilities to be conceived, designed, permitted, and constructed. In some regions, electricity for security systems may not be reliable or present at all. Therefore, it is suggested that considerations be made to utilize low-cost, secure, custom-built source storage options for use in a variety of areas and settings. In its simplest form, a small storage configuration could be constructed using readily available materials, personnel and equipment. It could also be provided as a kit to allow easy and inexpensive deployment, operation, and maintenance.

Because the ultimate end-of-life management goal for disused sources is permanent disposition, retrievability is an important consideration of interim storage. It is not uncommon for disused sources to be cemented into holes in the ground or other structures in such a way that subsequent recovery and disposal become difficult, if not impossible. With proper consideration, interim storage can be designed to allow for retrieval of disused sources while still providing substantial security against unauthorized intrusion.

In cases where expensive 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 risk 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.

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