SAFETY AND SECURITY OF RADIOACTIVE SOURCES: THE ROLE OF THE RADIOACTIVE WASTE MANAGEMENT CENTRE OF GHANA

ABDALLAH M. A. DAWOOD
Radiation Protection Institute, Ghana Atomic Energy Commission, Accra, Ghana | dawuud2000@gmail.com

ABSTRACT

- Hazards associated with ionizing radiation are deleterious to all living organisms and the environment in general.
- Sealed radioactive sources are the major sources of anthropogenic ionizing radiation in Ghana.
- They are applied in hospitals, in agricultural and food processing industries etc.
- When radioactive sources fail to serve their intended purpose, they become disused and are termed radioactive waste. Despite being disused, they have the potential to cause radiation injury and therefore need to be properly managed.
- They are also a subject of national security.

BACKGROUND / INTRODUCTION

- The Radioactive Waste Management Centre (RWMC) of the Ghana Atomic Energy Commission (GAEC) operates a Centralized Radioactive Waste Management Facility (CRWMF) radioactive waste generated in the country are managed.
- The facility undertakes only pre-disposal activities such as source retrieval and transport, characterization, conditioning and storage.
- RWMC in collaboration with the IAEA is implementing the borehole disposal system and currently at the safety case development stage
- To achieve the fundamental objective of safety and security, all activities adheres to national and international regulations including the IAEA's waste acceptance criteria (WAC).
- Quality management system of the facility contributes to adherence to safety protocols, follow best practices and deliver quality service.
- All activities must be permitted, inspected and approved by the Nuclear Regulatory Authority (NRA) of Ghana.

METHODS / IMPLEMENTATION

THE FACILITY

- The CRWMF (illustrated in Fig. 1) has two main partitions: 1). Controlled area (access restricted) and 2). Uncontrolled area (partial restriction).

SOURCE CHARACTERIZATION

- Refers to full identification of the source. The process ensures that physical, radiological and geometrical characteristics are measured and stored properly for future reference.
- Information include:

Type of source i.e. name of the device, name of radionuclide, original activity, current activity (at the time of characterization), manufacturer, date manufactured, country of origin, physical dimensions

SOURCE CONDITIONING

- Is the removal of the bare source from its original container; encapsulate in a standard stainless-steel container (Fig. 2). The aim is to significantly reduce the volume and weight of the source before disposal.

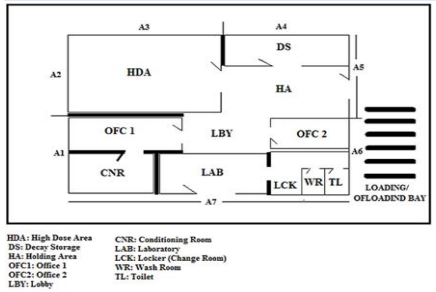

FIG. 1. The facility

FIG. 2. Source conditioning activities

OUTCOME / RESULTS

IAEA-CN294-13

QUALITY MANAGEMENT SYSTEM (QMS)

- The QMS is an information bank for safety and security, and offers a guide for safe and quality operation and service delivery.

SECURED WASTE AND INVENTORY

- Institutional control against inadvertent access, theft and unauthorized use.
- Electronic and manual waste inventory and registry built: Registry for sources in transit, legacy and orphan sources.
- A repository of the activity concentration of all consolidated sources.

CONDITIONED SOURCES

- Most of the waste consolidated; in a more secured state.

CONCLUSION

- The RWMC operates a licensed Centralized Radioactive Waste Management Facility where predisposal waste management activities such as characterization, conditioning and storage are conducted.
- To ensure safety and security as well as best practices, the Centre implements the IAEA's waste acceptance criteria (WAC) in its waste management processes.
- Plans are advance in building the latest disposal facility known as the borehole disposal system (BDS).
- Safety case for the BDS is under review at the IAEA

ACNOWLEDGEMENTS / REFERENCE

- The Ghana Atomic Energy Commission and the International Atomic Energy Agency provide logistical support.

REFERENCE:

- AEA (1996). International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115.
- IAEA (). Locating and characterizing disused sealed radioactive sources in historical waste, IAEA Nuclear Energy Series No. NW-T-1