



PHYSICAL PROTECTION OF SPENT RADIOACTIVE SOURCES

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Abstract

In 2014, ZCCM-Investments Holding through the Ministry of Health & Radiation Protection Authority (RPA) signed an agreement with the Office of Radiological Security (ORS) to design a security system to enhance protection of spent radiological materials stored in the Radiation Waste Storage Building (RWSB).

ORS aims to reduce & protect vulnerable nuclear and radiological materials located at civilian sites worldwide. ORS has since upgraded physical controls to secure spent sources stored at the interim RWSB.

Zambia ensures high priority that spent radiological materials are protected from theft and sabotage. A new guard room for security personnel was constructed for monitoring and surveillance of spent sources 24/7. This physical protection has improved safety & Security of spent sources.

key Words: Physical, Protection, Radioactive, Spent

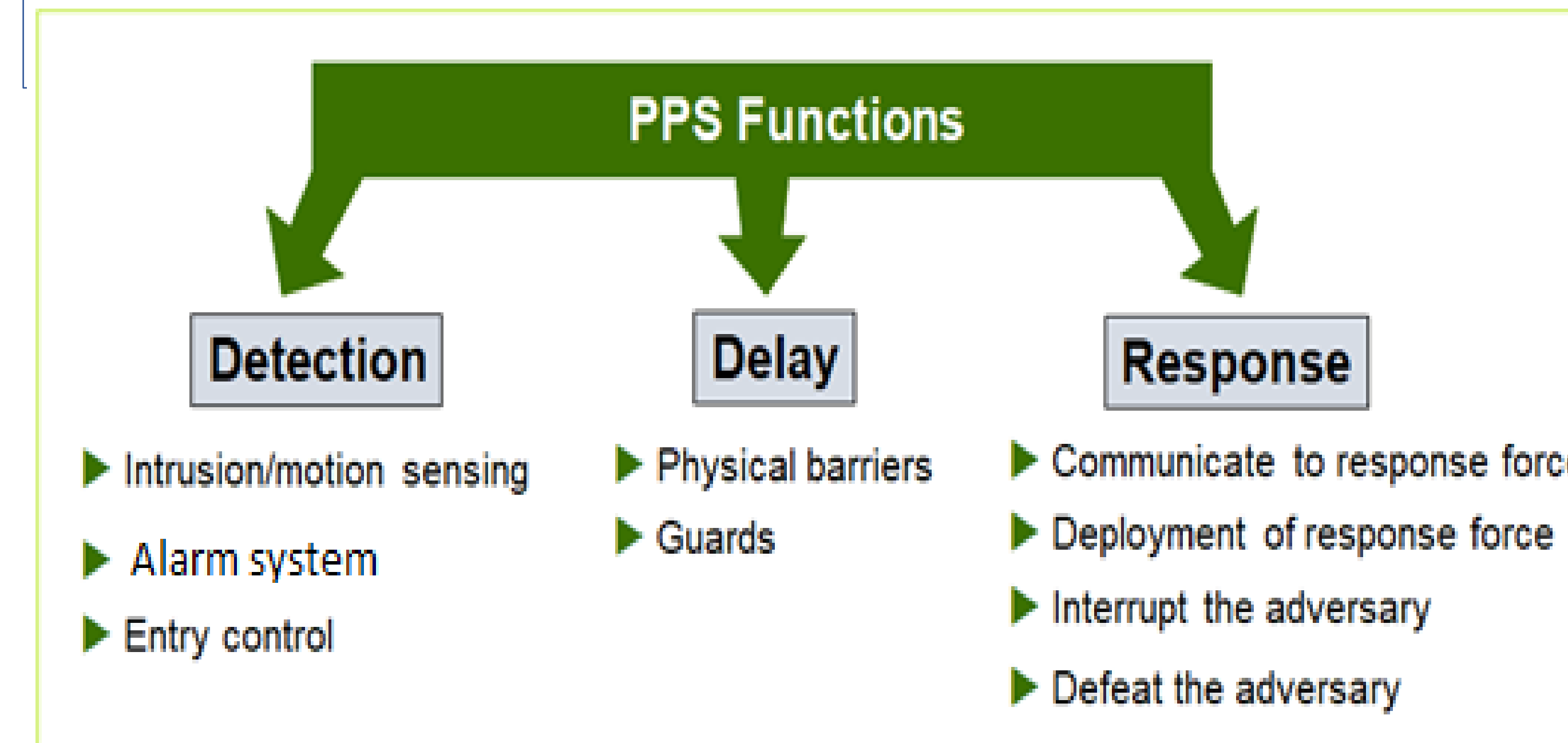
Introduction

The design for physical protection of spent radioactive sources aims to delay the adversaries through high security locks & early detection using alarm devices, video surveillance cameras, proximity cards identification for personnel and biometric finger prints to access security locks.

The Alarm system contains an alarm control panel that codifies the signals from the sensors, fixed duress buttons or the system itself and transfers it to a remote central monitoring station.

The equipment also has a UPS to ensure an uninterrupted transfer of power and ensure lighting and power surge protection.

Figure 1: PPS Function steps



Radiation Waste Storage Building

Spent sources are located in the Waste Storage Building (RWSB) which is compartmentalized into two zones (zones 1 & 2) using steel grills barriers.

Sources in zone 1 on the southern end of the facility can only be accessibility through zone 2. When there is no activity, the facility is protected by an approved physical protection system.

Access to RWSB is restricted to three authorized METS Officers whose authentication for access requires that the card and biometric access procedure is fulfilled at the same time.

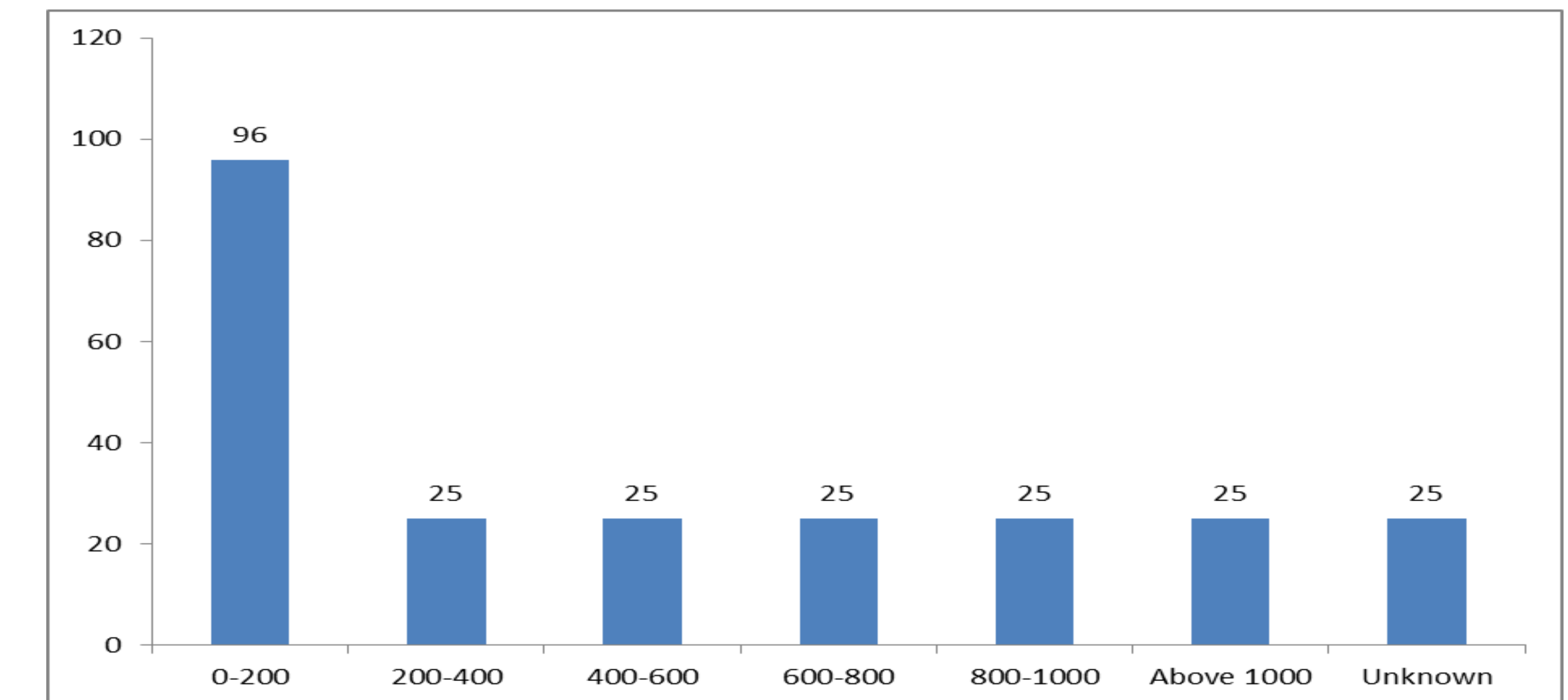
The control room is a standalone bullet proof structure which houses the Central Alarm Station (CAS) operated 24/7. The windows through which the operator views the entrance to the RWSB & Entrance to the Complex are also bullet proof windows to protect the operator

Inventory of Spent Radioactive Sources

Inventory includes 6 mg of radium needles Radio nuclides include Cs 137, plutonium 238, Iridium 192, Americium 241, Co 60, Radium 226, Americium-beryllium and some unknowns.

Activity ranges from 2 to 3000 mci with total activity of 2922.5 gbq. Most of the sources will only be exempted from regulatory control after 500 years.

Figure 2: Activity of spent sources



Figures 3 & 4: RWSB & Control Room

Figure 2. Storage of Radioactive Waste



Figure 3. Surveillance & Monitoring room



Conclusions

Zambia has made arrangements to keep spent sources and prevent unauthorised access into the Radiation waste storage building (RWSB).

The site has many delays and locks to make it difficult to get into the RWSB where the spent sources are located. In case of an emergency, the first security element must report to all the guard stations to support the site and take control of the situation affecting security, but if it were impossible to take control, he has to call the local police then inform the radiation specialist, who will in turn inform RPA accordingly.

Contact

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