

Legislative Framework towards Safe Management and Disposal of Disused Sealed Radioactive Sources: Nigeria's Experiences, Challenges and Prospects

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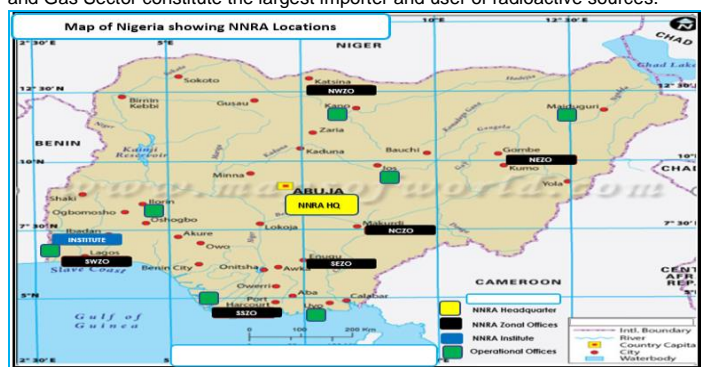
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1. Background

Nuclear technology is applied in numerous sectors of the Nigerian economy ranging from petroleum industry, Industrial sector, health sector, mining, agricultural sector, security screening, education and research, to handle many socio-economic challenges in a way that is beneficial to the public. The legislative framework for regulating the possession and application of nuclear technology in Nigeria is the Nuclear Safety and Radiation Protection Act No. 19 of 1995 (the Act), which establishes the Nigerian Nuclear Regulatory Authority (NNRA) as the only Competent National Authority saddled with the responsibility for nuclear safety and radiological protection regulation in Nigeria. The Act clearly establishes the requirement that mandates operators of nuclear and radiological facilities towards ensuring safe utilization, management and disposal of disused sealed radioactive sources thereby ensuring public and environmental protection from unjustified radiation exposure and contamination arising from such practices. The NNRA provides regulatory oversight on all facilities utilizing radioactive sources and ionizing radiation generating equipment in Nigeria thereby ensuring safe management after use in line with radiation protection standards. This paper highlights the role of Legislative Framework towards Safe Management and Disposal of Disused Sealed Radioactive Sources (DSRS) in Nigeria, and also highlights the Country's experiences, challenges and prospects in safe utilization of DSRS.

2. Country Overview

Nigeria is Located in West coast of Africa also referred to as Giant of Africa with a Population of 223,804,632 million persons, representing an increase of 2.41% from 2022 (according to the Macrotrends statistical estimate of 2023). It has a total Area of 923,766 square km of which 910,768 square km comprises of land and about 13,000 square km comprises of water. The country is also rated as Africa's top oil producer and Fifth-Largest liquified natural gas exporter in the world, and the economy majorly relies on crude oil and natural gas reserves which implies that Oil and Gas Sector constitute the largest importer and user of radioactive sources.



Map of Nigeria showing NNRA offices

3. Legislative and Regulatory Framework

Legislation:

- Section 1 of the Nuclear Safety and Radiation Protection Act 19 of 1995 established the Nigerian Nuclear Regulatory Authority (NNRA).
- The Act has The Act has been reviewed to Nuclear Safety, Security and Safeguard (NSSS) Bill in line with the provisions of the ACPNNM.

Regulations:

- Nigerian Basic Ionizing Radiation Regulation (NIBIRR, 2003) (Reviewed in line with GSR 3)
- Nigerian Safety and Security of Radiation Sources Regulation 2006 (Reviewed in line with NSS 11)
- Nigerian Transportation of Radioactive Sources Regulation 2006 (Reviewed in line with GSR 3 & SSR 6)
- Nigerian Radioactive Waste Management Regulation 2006 (Under review in line with GSR 3, GSR 5 & SSR 5)

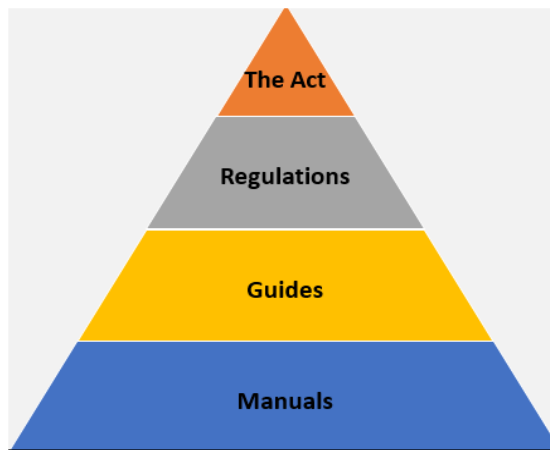
Policies:

- National policy on Radioactive Waste Management
- Authorization and Inspection Procedures
- Enforcement Policies and Procedures

6. Conclusions and Acknowledgements

In order to guarantee the protection of health, property, and the environment from the harmful effects of radioactive wastes, the Nigerian Regulations on Waste Management in which was gazetted in 2006, established the fundamental technical and organizational requirements to be met by waste generators and operators of waste management facilities. The provision of the regulations obliged Licensees to have a written agreement from the Manufacturer or Supplier stating that they would be willing to take back the depleted radioactive sources once they were no longer needed. However, such practice is not sustainable due to the possibility that the source owner might go bankrupt before the source useful life is over. Consequently, Nigeria has developed a radioactive waste management policy in this regard, particularly as Nigeria considers producing power using nuclear technology, in order to take comprehensive account of the management of Nigeria's abandoned radiation sources, including spent nuclear fuel. Similar to this, the Radioactive Waste Management Regulations have been revised, and a guidance document on how to implement the provisions of the regulations has been developed

The Authors wish to sincerely acknowledge and appreciate the International Atomic Energy Agency (IAEA) for acceptance of this poster paper as well as their continue support in capacity building towards safe management and disposal of radioactive waste among several other areas



The Hierarchy of NNRA Regulatory Framework

The NNRA since inception has emplaced a regulatory framework within the context of the Act to effectively fulfil its primary regulatory functions namely:

- Radiation Protection,
- Safety and Security of Radioactive Sources,
- Safeguard of Nuclear Materials and
- Physical Protection of Nuclear Installations.

4. Safe Management and Disposal Options for DSRS in Nigeria

All the radioactive sources used in Nigeria are completely imported. The safe management and disposal of DSRS is strictly adhered to in line with enabling legislation, Regulations and International Best Practices, for effective Regulatory Control Programme.

The safe management and disposal options for DSRS in Nigeria is mainly return back to supplier among several disposal options as presented in below:

- Authorized storage at the facility for delay and decay
- Authorized storage at the temporary waste management facility
- Return back to the manufacturer after use
- Clearance from Regulatory Control for activity below exemption limit
- Transfer to another user, for research and development.

5. Safe Management and Disposal Options for DSRS and the UN Sustainable Development Goals

- The NNRA since inception has emplaced its regulatory framework within the context of the Legislation and Regulations to effectively fulfil its primary regulatory mandate.
- Nigeria, through the NNRA developed numerous regulations and guides consistent with international standards for effective regulatory control regime thereby ensuring safety and sustainability
- The safe management and disposal of DSRS is key in contributing to Sustainable Development Goals (SDG) 14 and 15 of protecting life below water and life on land.



The United Nations Sustainable Development Goals