



Title: National Strategy and Planning for the Safe and Sustainable Management of Radioactive Waste and Spent Nuclear Fuel

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Background and Goal of the present work

- The Nigeria Atomic Energy Commission has developed the National Radioactive Waste Management policy as well as the Nuclear Fuel Cycle policy to express the intent of Government to manage radioactive waste and spent nuclear fuel in a safe, secure and sustainable manner to safeguard public health and the environment.
- As a follow up to these policies, a set of strategies has been developed for the management of radioactive wastes arising.
- The general viewpoint is that the management of radioactive waste involves the reduction to as low as reasonably practicable and justifiable, the associated risks through appropriate processing, containment and eventual disposal of processed waste.
- The most preferred approach in the management of radioactive waste are 'delay - decay', 'dilute-disperse'.
- The successful application of the ideas in optimization depends upon the commitment and involvement of the workers who are being protected.
- The main purpose of the paper is to specify the technical means and measures for the safe, secure and sustainable management of radioactive waste and provide a nation-wide framework for the development and implementation of a coherent, integrated and optimized system encompassing all types of radioactive wastes; including spent nuclear fuel (SNF) when considered as waste, disused sealed radioactive sources (DSRS) and Naturally-Occurring Radioactive Materials (NORM) generated in the country.
- The scope of the national strategy for the management of radioactive waste and spent nuclear fuel is intended for all categories of waste such as:
 - ✓ Institutional wastes
 - ✓ Disused Sealed Radioactive Sources (DSRS)
 - ✓ Reactor operational wastes
 - ✓ Spent nuclear fuel (SNF) - research reactor & power plant reactor
 - ✓ Decommissioned wastes
 - ✓ Naturally Occurring Radioactive Material (NORM) wastes

2.0 Challenges / Methods / Implementation

2.1. Challenges:

- Government policies - Security
- Public acceptance -Funding
- Technical Expertise -Infrastructures Deficit

2.2 Methods:

The National Strategy for Radioactive Waste Management developed at the national level or individual strategies developed by the radioactive waste generators at their level shall comply with the following requirements:

- Spent nuclear fuel considered as a valuable resource,
- Return of spent nuclear fuel (from research or power reactors) to supplier's countries,
- Return of disused sealed radioactive sources to suppliers or manufacturer's countries,
- Disposal of radioactive waste in dedicated facilities considered as the final end-point for safe and sustainable long-term management,
- Decay storage followed by authorized discharge to be considered as a possible option for the management of Category I low-level (very short lived) waste,
- Minimization of radioactive waste generation to be considered as a priority,'
- Reuse/recycling of radioactive materials to be considered in compliance with exemption and clearance levels,
- Interim storage of spent nuclear fuel in licensed, safe and secure facilities to be considered as an intermediate management step before repatriation to suppliers' countries or final disposal,
- Interim storage of disused sealed radioactive sources in licensed, safe and secure facilities to be considered as an intermediate management step before repatriation to suppliers' countries or final disposal.

2.3 Implementation:

- Presently, Nigeria does not have spent nuclear fuel; however, the only expected source of spent fuel will be from the MNSR facility in CERT (NIRR-1) supplied under the agreement (PSA) between IAEA, China and Nigeria; and from any other nuclear facilities that will be established in future. It is

expected that the manufacturers shall take back the spent core assembly at the end of its life-time.

- Spent Nuclear Fuel from the power reactors shall be considered as a valuable resource. Consequently, priority shall be given to returning Spent Fuel to the suppliers' countries.
- Based on the scenario for nuclear infrastructure development, it is planned that the following time lines shall apply for the development of waste disposal facilities:
- Deep geologic repository for Spent Nuclear Fuel and high-level wastes should be needed when fuel has been decay cooled for at least 30 years i.e., by 2055. This facility should remain open until 30 years after last reactor has closed.

3.0 Outcome / Results -Waste Management End-Points

- Near-surface disposal of low level wastes (LLW) as it arises: near-surface and/or borehole disposal of disused sealed radioactive source (DSRS) may be considered at the same facility.
- Deep disposal of spent nuclear fuel (SNF) in geologic formation at first opportunity (probably 20-30 years after its production). This shall also apply to the disposal of intermediate level long lived radioactive waste (ILW-LL).
- Intermediate level short lived radioactive waste (ILW-SL) may go to near surface or deep disposal facilities for the purpose of optimising the use of the facilities. The final choice shall depend on its nature & volume.

4.0 Conclusions and Acknowledgements

- Policies and strategies may need to be updated because of new national circumstances such as legislative changes, plans for new nuclear facilities, new international agreements and/or experience obtained with the original policy and strategy.
- This national plan and strategy shall be reviewed and updated every three years by the responsible organizations on the basis of the revised national inventory of radioactive waste and in conjunction with the preparation of the national report of Nigeria to the IAEA joint convention review meeting.
- Any revision of the national plan shall be submitted to the National Committee on Radioactive Waste Management for approval and to the Governmental authorities for their endorsement.
- The review of the national plan should be based on experience obtained in its implementation to identify any deficiencies that could be improved upon. This could include; making improvements in national structures for radioactive waste management, clarifying or modifying the roles and responsibilities of national organizations and making improvements in the funding arrangements for long term radioactive waste management to the National Committee on Radioactive Waste Management for approval and to the Governmental authorities for their endorsement.

5.0 References:

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