**RADIOACTIVE WASTE MANAGEMENT– THE DRAFT POLICY AND STRATEGY FRAMEWORK**

**ALL PROTOCOLS**

**1.0 INTRODUCTION**

It is with great joy to present this paper on radioactive waste management policy and strategy framework.This Radioactive Waste Management Policy and Strategy serves as a national commitment to address the country's radioactive waste issues in a coordinated and co-operative manner. It envisages that the management of radioactive waste in Nigeria shall be in accordance with national objectives and recognized international principles as set out in the Policy. These National policies and strategies for managing radioactive waste set out the country’s agreed position and plan for managing radioactive waste. It is the concern and intent of the government and the relevant national organizations to ensure that radioactive waste are properly taken care of.

**2.0 DEFINITIONS**

For the purpose of this presentation, the following definitions are used:

The words ‘policy’ and ‘strategy’ are often used interchangeably. In this presentation, Policy is a set of established goals or requirements for the safe management of radioactive waste; it normally defines national roles and responsibilities and as such, it is mainly established by the government. Policy may also be codified in the national legislative system. While

**2.1 Strategy** is the means for achieving the goals and requirements set out in the national policy for the safe management of radioactive waste. Strategy is normally established by the relevant waste owner or operator, either a governmental agency or a private entity. The national policy may be elaborated in several different strategies. The individual strategies may address different types of waste (e.g. reactor waste, decommissioning waste, institutional waste, etc.) or waste belonging to different owners.

**2.2 Radioactive** wastes are wastes that contain radioactive material. Radioactive wastes are usually products of nuclear power generation and other applications of nuclear fission or nuclear technology, such as research and medicine. Radioactive waste is hazardous to most forms of life and the environment, and is regulated by government agencies in order to protect human health and the environment.

In addition, radioactive waste, mainly in the form of disused sealed radioactive sources, results from the use of radioisotopes in medicine, research and industry. In recent years, it has been increasingly recognized that the residues from industries using and processing naturally occurring radioactive material (NORM) should also be managed as radioactive waste, even if the protection levels may differ. Spent nuclear fuel is regarded as a resource by some countries and as a radioactive waste by others. Irrespective of how it is considered, it must be safely managed until it is reprocessed or placed in a geological repository.

Special arrangements for the management of radioactive waste are necessary because of the radiological hazards associated with it. The preferred strategy is to contain the waste (i.e. to confine the radionuclide within the waste matrix, the packaging and the disposal facility) and to isolate it from the immediate environment in which humans live. Radioactive waste management therefore consists of collecting the radioactive waste, processing it into a form that can be stored safely, and then storing it, pending its final disposal, in surface or geological repositories. While most radioactive waste is in solid form, gaseous and liquid radioactive waste is also generated. Waste with activity below the authorized limits may be discharged under controlled conditions that ensure the protection of the public and the environment.

**2.2.1 TYPES OF RADIOACTIVE WASTE**

Radioactive wastes are grouped into three categories: high-level waste, low-level waste, and transuranic waste. High-level waste emits intense levels of ionizing radiation for a relatively short time, and then emits lower levels for a much longer time. Most high-level waste is used nuclear fuel rods, which must be removed from the reactor core about every 2–4 years. Large quantities of high-level wastes are also associated with the production and disposal of nuclear weapons.

**2.2.2** Low-level waste emits small amounts of ionizing radiation, usually for a long time, and it tends to be a high-volume waste. Low-level waste is produced from a variety of sources, such as filters and other cleaning material from nuclear plants, and used low-level radioisotopes from hospitals, universities, and industry. For example, in nuclear generating stations, tiny quantities of some radioactive materials may leak from the reactor. To protect the workers and the ambient environment, this radioactivity is removed with filters, which must periodically be replaced, becoming low-level waste.

**2.2.3** Transuranic waste results primarily from the fabrication of plutonium as well as research activities at defense installations. Transuranics are elements, not found in nature, that are heavier than [**uranium**](https://science.jrank.org/pages/7115/Uranium.html). Most transuranics have special properties that increase the probability of causing damage to living [**tissue**](https://science.jrank.org/pages/6847/Tissue.html). Transuranic elements are found in both high-level and low-level radioactive waste. They can be separated from low-level waste, and are then treated as high-level waste

**3.0 PRINCIPLES FOR ESTABLISHING A POLICY AND STRATEGY**

According to the IAEA Fundamental Safety Principles, the objective of radioactive waste management is to deal with radioactive waste in a manner that protects human health and the environment now and in the future without imposing undue burdens on future generations. These basic principles are applicable to all countries and can be applied to all types of radioactive waste, regardless of its physical and chemical characteristics or origin. These principles are:

—Responsibility for safety: The prime responsibility for safety must rest with the person or organization responsible for the facilities and activities that give rise to radiation risks;

—Role of government: An effective legal and governmental framework for safety, including an independent regulatory body must be established and sustained;

—Management of safety: Effective management of safety must be established and sustained in facilities and activities that give rise to radiation risks;

—Justification of facilities and activities: Facilities and activities that give rise to radiation risks must yield an overall benefit;

—Optimization of protection: Protection must be optimized to provide the highest level of safety that can reasonably be achieved;

—Limitation of risks to individuals: Measures for controlling radiation risks must ensure that no individual bears an unacceptable risk of harm;

—Protection of present and future generations: People and the environment, present and future, must be protected against radiation risks;

—Prevention of accidents: All practical efforts must be made to prevent nuclear or radiation accidents;

—Emergency preparedness and response: Arrangements must be made for emergency preparedness and response in case of nuclear or radiation incidents;

—Protective actions to reduce existing or unregulated radiation risks: These must be justified and optimized. Other relevant considerations include:

—Public participation in decision making: Decisions which may have a potential health, social or environmental impact should be made in consultation with those who may be affected.

—Sustainable development: In view of the long periods of time into the future that radioactive waste may have to be safely managed, sustainability considerations are relevant. There should, therefore, be a focus on meeting the needs of the present without compromising the ability of future generations to meet their own needs.

The principles and considerations listed above may not be explicitly present in national policy but they will usually have influenced it as well as the relevant national laws, regulations and guidance that flow from it. They provide a commonly understood basis for guiding all activities related to the safe management of radioactive waste.

**4.0 GOVERNMENT RESPONSIBILITIES**

It is the concern and intent of the government and to ensure that radioactive waste is properly taken care of by:

* Policy making
* Establishing and implementing a legal framework
* Establishing regulatory bodies
* Ensuring co-operative governance
* Radioactive waste management where the generator no longer exists
* The provision of institutional control over closed disposal facilities and the funding thereof
* Ensuring a nationally co-ordinated approach to radioactive waste management
* Fulfilling national obligations in terms of international agreements where applicable
* Reviewing and updating of the national policy and strategy for radioactive waste management
* Ensuring adequate national competence and capacity
* Ensuring compliance with this policy and implementation of the strategy.

**5.0 NNRA RESPONSIBILITIES**

Nigerian Nuclear Regulatory Authority (NNRA) as one of the regulatory bodies in the country is responsible for

Issuance of regulations and guidance documents

Monitoring and enforcing compliance

Reviewing, approving or rejecting applications and issuing, amending, modifying, suspending, cancelling licences or other authorisations for radioactive waste management

Making recommendations to government regarding the development and implementing of a national policy, strategy, laws and objectives to ensure the safe management of radioactive waste.

1. **GENERATORS AND OPERATORS RESPONSIBILIIES**

The responsibility of the generators of radioactive waste, or operators of radioactive waste management /disposal facilities, as the case may be, will be terminated upon closure of the disposal facility at which time institutional control (where required) will commence

The technical, financial and administrative management of wastes.

Development and ongoing review of site specific waste management plans.

Execution of waste management plans by the establishment of appropriate waste management facilities and processes and the development of site specific waste management systems.

Site waste management in accordance with waste management systems to reflect sustainable development and principles.

**7.0 NATIONAL STRATEGY-PRINCIPLES**

The following hierarchy of waste management options shall be followed where practicable:

* Waste avoidance and minimisation
* Re-use, transfer to another user and recycling
* Storage
* Conditioning and Disposal

The national radioactive waste management strategy shall cover the total life cycle of waste management – generation to institutional control.

To provide future generations with freedom of choice and to build confidence, all radioactive waste disposal options shall provide for a defined period during which retrievability will be possible.

Measures aimed at enhancing retrievability should not compromise the operational and long-term safety of a disposal option.

Final disposal is regarded as the ultimate step in the radioactive waste management process although a step-wise mgt approach is acceptable. Long-term storage of e.g. HLW, LLW and spent sources may be regarded as one of the steps in the management process.

The aim shall be to achieve a maximum degree of passive safety in storage and disposal.

The establishment, operation, decommissioning and closure of waste generating and disposal facilities shall be in accordance with all regulatory requirements

The deliberate dilution of radioactive waste is not acceptable, however in the case of Naturally occurring radioactive material (NORM) the dilution of higher concentration material with lower concentration material will be considered provided all relevant regulatory concerns are addressed.

**8.0 PROVISION OF RESOURCES**

The waste owner (Government or Private) is generally considered to be financially responsible for ensuring that radioactive waste is properly and safely managed. However, the arrangements for the long term management of radioactive waste are normally coordinated or overseen at the national level. Thus, the national policy should set out the arrangements for:

— Establishing the mechanisms for providing the resources or funds for the safe, long term management of radioactive waste;

— Ensuring that there are adequate human resources available to provide for the safe management of radioactive waste, including, as necessary, resources for training and R&D;

— Providing institutional controls and monitoring arrangements to ensure the safety of radioactive waste storage facilities and waste repositories during operation and after closure.

9.0 **CONCLUSION**

The general aim in the management of radioactive waste is to reduce to as low as possible, the associated risks by appropriate disposal and the ultimate objective of protecting individuals, society and the environment from the harmful effects of ionizing radiation due to radioactive waste, both now and in the future.

Government shall establish a National Committee on Radioactive Waste Management resident in the Nigeria Nuclear Regulatory Authority which will oversee the implementation of this policy and strategy**.**