Nigeria's experience with implementing the Code of Conduct and the Joint Convention on the Safety of Radioactive Waste and Spent fuel in relation to Nigeria's management in DSRS

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Introduction

Radioactive sources are widely used in several sectors of the Nigerian national economy, but all are imported. The responsibility for regulating Radioactive Sources lies solely with the Nigerian Nuclear Regulatory Authority (NNRA) as is given in the Nuclear Safety and Radiation Protection Act 19 of 1995 (**Act**).

2. **The Nuclear Safety and Radiation Protection Act (Act)**

The Nigerian Nuclear Regulatory Authority (NNRA) was established in May, 2001 in accordance with the provisions of the Act and charged with the responsibility for nuclear safety and radiological protection regulation.

The legal framework, the **Act**, its regulations and such other legal documents as may be issued from time to time, through the issuance of licences, certificates, and other orders. Section 47 of the Act empowers the NNRA to, with the approval of the President, make regulations prescribing anything required under the Act.

The National Regulations are equally based on international safety guidance documents issued by the IAEA and also national experiences derived from countries with vast regulatory experiences. Draft regulations are usually circulated to all stakeholders for comments which are then incorporated into the Drafts and presented at National Workshops for discussions. The products of such Workshops are then presented to the Governing Board for approval and onward transmission to Mr. President for approval before being finally gazetted by the Federal Ministry of Justice.

The Nigerian Basic Ionizing Radiation Regulations (NiBIRR) was the first regulation gazetted in 2003 and fashioned after the **IAEA Basic Safety Standard (BSS 115)**.

Subsequently, the following regulations were gazetted by the Justice Ministry:

i. Nigeria Safety and Security of Radioactive Sources Regulations (2006)
ii. Nigerian Safe Transport of Radioactive Materials Regulations (2006)

iii. Nigerian Radiation Safety in Diagnostic and Interventional Radiology (2006)
iv. Regulations Nigeria Radiation Safety Regulations in Nuclear Medicine Practice (2006)
v. Nigeria Radiation Safety Regulations in Radiotherapy (2006)
vi. Nigeria Radiation Safety in Industrial Radiography Regulations (2006)
vii. **Nigeria Radioactive Waste Management Regulations (2006)**
viii. Nigeria Radiation Safety in Industrial Irradiator Regulations (2008)
ix. Nigeria Radiation Safety in Nuclear Well Logging Regulations (2008)
x. Nigeria Naturally Occurring Radioactive Materials Regulations (2008)

3. **Safety and Security of Radioactive Sources**

Radioactive sources are extensively used for beneficial purposes in medical, industrial, agricultural, research and educational applications. However, their safety and security remain a matter of concern. Loss of control over some sources have sometimes occurred, giving rise to “orphan” sources. Furthermore, some sources which preceded the establishment of the NNRA and whose owners do no longer exist, give rise to “legacy” sources.

There is the importance of ensuring that proper control of radioactive sources during their life cycle is established and maintained. The NNRA in 2005 thus established the general requirements for the safety and security of radioactive sources consistent with the international basis for a coordinated approach to the safety and security of radioactive sources. Measures have been put in place by the NNRA to ensure sustainable control of radioactive sources, these include:

i. The implementation of the **Code of Conduct on the Safety and Security of Radioactive Sources** (**Code**) and the **IAEA Guidance on Import and Export of Radioactive Sources** (**Guidance**)

The implementation of the Code and Guidance forms the cornerstone of the safety and security of radioactive sources. **Since all radioactive sources used in the country are imported and all spent or disused sources are exported back to their manufacturers**, it implies that Nigeria must exercise an efficient import-export control. Safety and security measures therefore cover import, internal transportation, internal storage at various locations in Nigeria, uses in Nigeria and final export out of Nigeria.

In this regard, all the provisions of the **Code and Guidance in addition to the Act and other IAEA Safety Series documents**, led to the gazzetting of the **Nigeria Safety and Security of Radioactive Sources Regulations** in 2006.

ii. Installation of **Radiation Portal Monitors** (**RPM**) at ports of entry

To strengthen import-export control, at the request of the Federal Government of Nigeria, IAEA donated a Radiation Portal Monitor (RPM), which was installed at the Export Terminal of the Murtala Mohammed International Airport in Lagos. The successful installation and operation of the RPM has led government to make budgetary provisions for the installation of 3 more RPMs at other selected ports in Nigeria to prevent accidental or undeclared import and export of radioactive sources or disused Sealed Radioactive Sources. This is presently being implemented in cooperation with foreign technical partners.

iii. In 2005, the Federal Government of Nigeria at the highest level, declared its intension to generate electricity through nuclear technology and in pursuance of this objective;

Nigeria began to set up necessary programmes and framework which included the ratification of all international conventions bordering on nuclear safety. The instruments deposited with IAEA in 2007 included **accession to the Joint Convention on the Safety of Spent Fuel Management and on Safety of Radioactive Waste Management (the Convention).**

4. Spent Fuel Management Policy and Practices

Nigeria does not have spent fuel presently, no reprocessing plant and there is yet no immediate plan to have one. Nigeria has only one Radioactive Waste Management Facility (RWMF) located in the Centre of Energy Research and Training (CERT), Zaria, Kaduna State. The RWMF has a Memorandum of Understanding (MOU) with the Authority on Management of the RWMF. The RWMF has qualified trained staff and is licensed by the Authority. The facility is yet to be fully functional. The attached storage facility has also been licensed for temporary storage of retrieved legacy sources pending their repatriation or their eventual containment and final storage or disposal.

Legacy sources have been found in a steel mill in the country and through the NNRA Liaising with IAEA on how to condition the sources and export them to their country of origin.
However in anticipation of spent fuel from the NIRR-1 miniature reactor facility in CERT, Zaria and the proposed acquisition of nuclear power plants in the country, NNRA has set up a Technical Advisory Committee (TAC) on preparation of regulatory and guidance documents on the Management of Spent Nuclear Fuel.
The NIRR-1 fuel was supplied under a Project Supply Agreement (PSA) between the IAEA, China and Nigeria. It is expected that the vendors shall take back the spent core assembly at the end of its life-time.

The NNRA authority has an inventory of radioactive sources which is by law updated on an annual basis using Regulatory Authority Information System (RAIS)

5. **Radioactive Waste Management**

The international community through the International Atomic Energy Agency (IAEA) has developed a comprehensive set of principles for the safe management of radioactive waste. 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.

As a member state of the IAEA therefore, and in accordance with National and International objectives, the NNRA in accordance with its mandate has developed Nigerian Government's policy and Regulations to deal with radioactive waste in a manner that protects human health and the environment, now and in the future. In this regard, the NNRA gazetted the **Nigeria Radioactive Waste Management Regulations** in 2006 and the **Nigerian Naturally Occurring Radioactive Materials Regulations** in 2008.

6. **Securing of Legacy Radioactive Sources**

Preceding the establishment of the NNRA, owners of Radioactive Sources do no longer exist. This gave rise to “legacy” sources. The International Atomic Energy Agency (IAEA) proposed the movement of such sources to the temporary Radioactive Waste Management Facility located in CERT, Zaira, Kaduna State, Nigeria for temporary storage pending the final repatriation to its country of origin. While discussions are ongoing with the IAEA, the NNRA has taken steps in assessing the possibility of utilizing the Isotope Laboratory (Hotcell) located in Nigeria’s steel company for the removal and conditioning of the sources.

7. **Achievements**

It is mandatory and a requirement for all users of Sealed Radioactive Sources to provide evidence of return to manufacturer before Importation Licence is issued. All importation and use of sealed radioactive sources of ionizing radiation are now fully subject to NNRA authorization, thus enhancing national nuclear safety and security and ensuring ***from cradle to grave*** oversight of radioactive sources.

At ports of entry and exit the relevant Frontline Officers ensure that the required Licence are provided before sources cross such points.

Recently, **the Nuclear Safety, Security and Safeguards Bill** was drafted and it's in it's second reading at the National Assembly.

The **National Nuclear and Radiological Emergency Plan**, and the **National Radioactive Waste Management Policy and Strategy** were drafted and also forwarded to Mr. President for the approval.

An agreement of cooperation was signed with the United States of America Department of Energy (US-DOE) on upgrading of nuclear security in the country under the **International Radiological Threat Reduction Initiative** (IRTR) program and **Global Threat Reduction Initiative** (**GTRI**)

NNRA has also taken steps notably through the training of Frontline Security Officers in the use of radiation detection equipments.

For the purpose of improving the safety of radioactive wastes generated, Nigeria plans to:

i. Establish and operate a suitable inventory of radioactive wastes of all types
ii. Conduct audit of radioactive materials in RWMFs periodically
iii. Continue to conduct periodic inspection of existing facilities and ensure that all prospective RWMF are properly licensed
iv. Construct and operate more RWMF in the country so as to take care of the vastness of the country and need to transport radioactive wastes through long distances
v. Establish a National Repository for conditioned wastes
vi. Train more staff on radioactive waste management
vii. commence the exercise of locating orphan and legacy sources.
viii. Continue the radiation safety and security enlightenment campaign in the electronic and print media

References:

i. Nigeria Safety and Security of Radioactive Sources Regulations
ii. The Nigerian Basic Ionizing Radiation Regulations (NiBIRR)
iii. Joint Convention on the Safety of Spent fuel Management and on the Safety of Radioactive Waste Management, Nigerian National Report, September 2008
iv. Nigerian Regulation for Radioactive Waste Management.
v. Nigerian Radioactive Waste Management Policy and Strategy.

NNRA Website: www.nnra.gov.ng

Thank you