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Topic: Integrated Nuclear Security Support Plan (INSSP): Enhancing Nigerian National Nuclear Security Regime

Authors: N. A. Bello and E. E. Ofoegbu
Affiliation: Nigerian Nuclear Regulatory Authority
Corresponding Author Email: nasiru.bello@nnra.gov.ng

Abstract:
The application of ionizing radiation sources in various sectors of the Nigerian economy pre-dates the establishment of the Nigerian Nuclear Regulatory Authority (NNRA) as the competent authority for nuclear safety and radiological protection regulation in Nigeria. The NNRA established by Act 19 of 1995 commenced operation in 2001. In early 2000, Nigeria recorded loss of control incidences involving radioactive material. Nigeria has hosted several IAEA missions such as the International Nuclear Security Advisory Service (INSServ) Mission, Radiation Safety and Security of Radioactive Sources, Infrastructure Appraisal (RaSSIA) Mission, etc. The overall objective of these missions was to assess Nigeria nuclear security needs and develop a plan of action for the improvement of nuclear security regime in the country. Based on the Missions recommendations, Nigeria saw the need to systematically document, assess and evaluate national nuclear security architecture. Precisely, one of the recommendations of the INSServ Mission was the development of Nigeria Integrated Nuclear Security Support Plan (INSSP). It contains a list of activities necessary for instituting effective nuclear security infrastructure in the country based on the gaps identified by the IAEA Missions to Nigeria. Nigeria in 2010 approved the first Integrated Nuclear Security Support Plan (INSSP). The INSSP is reviewed every three years in order to track the implementation progress as well as update the plan. It is unique as it takes into account nuclear security activities between the country and the IAEA and those undertaken through bilateral assistance. Through the INSSP Nigeria's needs in terms of legislative assistance related to nuclear security, participation in international, regional and national training courses as well as education and most importantly building nuclear security capacity among national stakeholders are being addressed amongst others. The presentation, therefore is to highlight the importance of the INSSP in the Nigerian nuclear security architecture and the achievements recorded in the six functional areas of the Nigeria INSSP.

Introduction:

Nigeria has diverse application of nuclear and other radiological material in its economy, hence there is need for effective nuclear security of these material to ensure that that it they are not used for malicious purpose. In order to achieve this, Nigeria hosted several IAEA missions such as the International Nuclear Security Advisory Service (INSServ) Mission, Radiation Safety and Security of Radioactive Sources, Infrastructure Appraisal (RaSSIA) Mission, among others. The overall objective of these missions was to assess Nigeria nuclear security needs and develop a plan of action for the improvement of

nuclear security regime in the country. Based on the Missions recommendations, Nigeria saw the need to systematically document, assess and evaluate national nuclear security architecture. Precisely, one of the recommendations of the INSServ Mission was the development of Nigeria Integrated Nuclear Security Support Plan (INSSP). This was conceived in 2007 through 2009. The IAEA in 2010 conducted an INSSP Mission to discuss and finalize the Draft Nigerian INSSP which approved the same year for a period of 3 years. This INSSP identified and consolidated the Nigerian's nuclear security needs into an integrated document that includes the necessary enhancements to its nuclear security arrangements, as well as provide a customized framework for coordinating and implementing nuclear security activities within the country. This document was first reviewed in 2016 and the last review was performed in 2019. Nigeria in collaboration with the IAEA and other international donor agencies is implementing a number of activities under the Six (6) thematic functional areas.

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2. Legal Framework for Nuclear Security in Nigeria

Nigeria in 1995 promulgated the Nuclear Safety and Radiation Protection Act 19 (Act), which established the Nigerian Nuclear Regulatory Authority (NNRA). The Act empowers the NNRA among others to:

- Ensure the protection of life, health, property and the environment from the harmful effects of ionizing radiation
- Perform all necessary functions to enable Nigeria meet its national and international safeguards and safety obligations
- **Advise the Federal Government on nuclear security, safety and radiation protection matters**
- Liaise and foster cooperation with international and other organizations having similar objectives.

These have been achieved through NNRA regulatory control programme which is hinged on five pillars of authorization; oversight function; regulations and guidance; emergency planning and response and contingency plan; and other ancillary functions.

Nigeria has committed to a number international instruments bordering on security and has domesticated the provisions of some of these instruments either by developing new regulations or reviewing its extant laws and regulations

Nigeria has signed and ratified a number of Legally binding international instruments such as the Convention on Physical Protection of Nuclear Material (CPPNM); and its Amendment; International Convention for the Suppression of Acts of Nuclear Terrorism; United Nations Security Council Resolutions 1540 and 1373 among others. Additionally, Nigeria has also made political commitment to other non biding international instrument like the Code of Conduct on Safety and Security of Radioactive Sources and the Supplementary Guidance to the Coide on Import and Export of Radioactive Sources.

2.1. NATIONAL SECURITY STRATEGY

Nigeria has reviewed its national security strategy to include nuclear security and this is periodically reviewed. This is coordinated by the Office of the National Security Adviser (ONSA).
Additionally, Nigeria has incorporated detection of MORC in its technical sweep for any major event. The Pilot training course on detection of MORC during technical sweep was organized by NNRA in May 2019 and Intelligence and law Enforcement Agencies participated. A National Training Course is being envisaged in Q1 of 2020 for larger stakeholder organizations.

3. Nigerian Integrated Nuclear Security Support Plan (INSSP)

3.1 Functional Area 1: Legal and Regulatory Framework:

3.1.1 Revision of the Laws related to Nuclear Security: Draft Nuclear Safety, Safeguards and Security (NSSS) Bill

Despite the recognition of nuclear security in the current NNRA Act, it has been observed that the provisions are not adequate especially as Nigeria plans to embark on Nuclear Power Programme. Also the need for the implementation of the obligations contained in the International instruments which Nigeria is party to and the recommendations emanating from the several IAEA Mission which identified gaps in the legislative framework for nuclear security in Nigeria, these prompted the review of the Act to produce the **Draft Nuclear Safety, Security and Safeguards (NSSS) Bill which is a comprehensive law. It was developed using the IAEA Handbooks on Nuclear Law and with the assistance of the IAEA Office of Legal Affairs (OLA).**

3.1.2 Development and Review of Regulations

Developed a number of Regulations based on the provisions of the relevant International Instruments to support the implementation of an effective nuclear security regime in Nigeria. The draft Nigerian Regulations on Physical Protection of Nuclear Material and Nuclear Facilities and revising the Nigerian Safety and Security of Radioactive Sources Regulations, 2006 using IAEA relevant publications and with support from the IAEA and other international organizations such USDOE.

3.2 Functional Area 2: Threat and Risk Assessment

3.2.1 National Threat and Risk Assessment for Material Under Regulatory Control (MURC):Nigeria in collaboration with the IAEA conducted a National Workshop on Development, Implementation and Maintenance of Design Basis Threat in November 2012 in Abuja. The objectives of the Workshop were to build internal capacity in threat assessment and strengthen physical protection of nuclear and other radioactive material and facilities in the country. Based on the conclusion of the Workshop, a guideline on the Development, Implementation and Maintenance of DBT was developed in May 2013. By June 2013, threat assessment was conducted for nuclear and other radioactive materials and facilities in the country and based on the outcome of the treat assessment the first DBT was developed, approved and issued in August 2013. It covers a wide range of threats. It was first reviewed in 2016 the last review was done in 2018.

3.2.2. National Threat and Risk Assessment for Material Out of Regulatory Control (MORC)

Nigeria Participated in the IAEA Regional Workshop on Threat Assessment and Risk Informed Approach for Nuclear and Other Radioactive Material Out Of Regulatory Control, Nairobi, Kenya from 18th – 22nd March 2019. Also Nigeria in collaboration with USDOE- Office of Nuclear Smuggling Detection and Deterence (NSDD) conducted a National Workshop on Threat Assessment and Risk Informed Approach for Nuclear and Other Radioactive Material Out Of Regulatory Control, Abuja, Nigeria, 8^{th} – 12^{th} April 2019. Consequently, building on the experience gained from the two workshops, Nigeria is currently conducting national threat and risk assessment for nuclear and other radioactive material out of regulatory control using the model provided during the workshop. The result of the assessment will be used in the development of Nigeria Nuclear Security Detection Strategy.

3.3: ***Functional Area 3: Physical Protection Regime***

3.3.1**. Physical Security Upgrade**: Nigeria signed a Nuclear Security Cooperation Agreement with the United States Department of Energy (US-DOE) in March 2005. An assessment Mission was conducted in Nigeria in April 2008 by a team of physical security experts from the USDOE. The aim was to assess the high risk radiological facilities in the country for possible physical security upgrades. The physical security upgrades commenced in 2009 and after the upgrade, there was a warranty period of 3 year. After the warrantee period, and assurance mission was conducted. The mission recommended afresh upgrade by deploying a superior technology. The fresh upgrade was recently concluded in all the high risk radiological facilities by USDOE-National Nuclear Security Administration, Office of Radiological Security.
Additionally a fresh upgrade is being planned for the Nigerian First Research Reactor (NIRR-1) with support from US-DOE Office of International Nuclear Security (INS).

Nigeria conducts verified inventory of radioactive sources in all regulated facilities. Nigeria has established national System of Accounting and Control of nuclear material and National inventory of radioactive using the IAEA Regulatory Authority Information System (RAIS) software.

3.3.2**. International Physical Protection Assessment Service (IPPAS) Workshop**

One of the components of the Nigeria INSSP was the conduct of IPPAS Workshop preparatory to the Mission. The workshop was finally conducted 2017 in collaboration with the IAEA. The objective of the Workshop was to create awareness on IPPAS Mission. It was also aimed at strengthening nuclear security regime in the country. Plans are underway to host the IPPAS Mission.

3.3.3. **IAEA National Table-Top Exercise Workshop for Security of Nuclear Material in Transport, 31st July - 4th August 2017 in Abuja**

Nigeria organized this Workshop in collaboration with the IAEA in 2017 in preparation for the shipment of the High/Low enriched uranium as part of the core conversion programme for NIRR-1. The objectives of the Exercise were to familiarize participants

on the planning process, review and execution of transport security plan (TSP) and to enhance Nigeria's capability to safely and securely transport nuclear material

3.3.4 National Training Course on Preventive and Protective Measures Against Insider Threat, 19 – 22 February 2018, Abuja

Nigeria in collaboration with the IAEA organized a National Workshop on Preventive and Protective Measures against Insider Threat in 2018. The training provided necessary guidance on preventing insider threats to all competent authorities and operating organizations. It also focuses on guiding the participating organizations in applying systematic approach in carrying out vulnerability assessment of insider threat characteristics and measures to control insider threats.

Nigeria has developed Guidance document on Insider Threat Mitigation for the Research Reactor with the support United States Department of State (US-DOS) Partnership for Nuclear Security (PNS) Support. The NNRA is currently developing trustworthiness programme for its personnel.

3.3.5. US-DOE, NNSA TRANSPORT SECURITY ASSESSMENT VISIT TO NIGEERIA, 30th April – 3rd May 2018

Nigeria hosted this mission in 2018. It was in collaboration with NNSA. It was aimed at conducting an assessment of transportation security regime for radioactive material in the country and thereafter provides recommendations for possible upgrades, transportation security assessment and training for all relevant stakeholder organizations. This culminated in the conduct of a national Workshop on Transport Security Response which was held in Lagos, Nigeria in August 2019

3.3.6. *Functional Area 4: Detection of criminal and unauthorized acts involving (MORC)*

3.3.6.1 NIGERIA NUCLEAR SECURITY DETECTION ARCHITECTURE (NSDA)

The frequent loss of control of radioactive sources experienced in early 2000 and the mis-declaration of radioactive materials as mould incidences experienced in the country caused the country serious embarrassment. It was on this premise that the IAEA assisted Nigeria to install radiation portal monitor at the MMIA Export terminal in 2009. However, this was not properly managed because of lack of effective collaboration among the stakeholders. Consequently, Nigeria is collaborating with the IAEA to develop a national nuclear security detection architecture. Through the Integrated Nuclear Security Support Plan (INSSP), Nigeria has developed NSDA roadmap with the assistance of the IAEA. In October, 2017, the IAEA organized a national stakeholders meeting preparatory to the IAEA Regional Meeting in Addis Ababa. The objectives of the meeting were to raise awareness among decision makers on the importance of NSDA and review the IAEA Questionnaire on NSDA. The IAEA finally organized the Regional Coordination Meeting in Addis Ababa in February 2018. The objectives of the coordination meeting were to:

- Enhance awareness on the importance of an NSDA and its components
- Promote an integrated planning process for development of an NSDA.

- Discuss roles and responsibilities of the various stakeholder organizations
- Assess existing national capabilities and resources

The outcomes of the Regional Meeting were the development of draft roadmap and action plan for the implementation of the roadmap under different milestones: planning, implementation and evaluation.

As part of the implementation plan, a policy document was developed and approved by the National Security Adviser (NSA). This document identified all relevant stakeholder organization with their roles and responsibilities.

3.3.7. Functional Area 5: Response to criminal and unauthorized acts including MORC

3.3.7.1: Emergency Preparedness Review (EPREV) Mission

Nigeria hosted the IAEA EPREV Mission in June 2015. The purpose of the Mission was to conduct a review of Nigerian nuclear and radiological emergency preparedness and response arrangements and capabilities as Nigeria is embarking on nuclear power programme. The nuclear and radiological emergency framework is built on the existing National Emergency Management system in the country. The mission visited key response organizations in the country which expressed their interest to improve or develop their emergency preparedness and response arrangements for the nuclear power programme.

The mission identified some areas where improvements should be considered and where progress should be sustained. The recommendations from the mission are currently being implemented.

In furtherance of the above, Nigeria has developed a Draft National Nuclear and Radiological Emergency Plan (NNREP) and it has been integrated into the National Emergency Response Plan which has been integrated into the National Emergency Response Plan.

The IAEA assistance for the review of the draft NNREP in relation to nuclear security events is being planned for 2020.

Additionally, Nigeria is a member of the IAEA Incident Trafficking Database (ITDB) since August 1998. The ITDB Point of Contact is the Director General/CEO of NNRA.

3.3.7.2. IAEA ASSISTANCE MISSION

Following the discovery of radioactive sources in shipments of scrap metal in 2018 and 2019, Nigeria explored the opportunity provided by the Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency which it signed and ratified in 1986 and requested for assistance from the IAEA on 13th May 2019. The mission was finally conducted from 4th – 6th June 2019. The mission provided advice on strategies to prevent further occurrences of such events. Nigeria is currently implementing the recommendations from the mission.

3.3.7.3. US-DOE OFFICE OF RADIOLOGICAL SECURITY (ORS) INTERNATIONAL RESPONSE TRAINING (IRT), COURSE, VIENNA, AUSTRIA, 11th - 15th JULY 2016

The United States Department of Energy (US-DOE) Office of Radiological Security (ORS) formally known as US-DOE Global Threat Reduction Initiative (GTRI) enhances global security by securing high activity radioactive material and preventing its use in acts of terrorism; removing and disposing disused radioactive sources; and reducing the global reliance on radioactive sources through replacement with viable non-isotopic alternative technologies if possible and increasing security where high-priority radiological materials are still required. It was on this premise that the ORS organized a meeting with the Nigerian delegates in Vienna, Austria from 21st - 22nd January 2016. The objectives of the meeting was to review the bilateral cooperation between Nigeria and the US-DOE and come to an agreement on the path forward for further nuclear security cooperation; discuss nuclear and radiological security in Nigeria and identify other areas of cooperation between the Nigeria and the US-DOE Office of Radiological Security (ORS). During the meeting, it was agreed that an International Response Training Course should be organized for Nigeria. The scope of the training among others include effective use of radiation detection equipment, incident response/first responder duties and actions, site visit, site survey, target folder development and response assessment exercise. Furthermore the targeted audience was agreed upon.

Consequently, the training course was organized by the US-DOE National Nuclear Security Administration, (NNSA) Office of Radiological Safety (ORS) in collaboration with the Nigerian Nuclear Regulatory Authority in Vienna Austria, from 11th - 15th July 2016 in Vienna, Austria. The objective of the training course was to strengthen the Nigerian capability to respond to radiological security events in the country.

Twenty Five (25) participants from Nigerian Police Force, (NPF); Nigeria Security and Civil Defence Corps (NSCDC); Centre for Energy Research and Training (CERT), Zaria; Ahmadu Bello University Teaching Hospital (ABUTH),Zaria; Gamma Irradiation Facility, (GIF); EKO Hospital, Lagos and University College Hospital, Ibadan; and Nigerian Nuclear Regulatory Authority, (NNRA) participated in the training course.

3.3.7.3.1.National Workshop on Train-the-Trainers on Alarm Response Training Course Development for Nuclear and Radiological Security Stakeholders in Nigeria - 5th – 8th June 2017

In order to indigenize the Alarm Response Training Course, a transition workshop was conducted in Abuja, Nigeria from 5th – 8th June 2017 by ORS Contractor from Pacific Northwest National Laboratory (PNNL). The objective of the workshop was to assist Nigeria develop customized training course material for the purpose of sustaining radiological security effort locally. The Workshop was further aimed at guiding the participants in applying systematic approach to training (SAT) model in the actual development of training course materials.

It was attended by twenty one (21) participants from the Nigeria Police Force (NPF), Nigeria Security and Civil Defence Corps (NSCDC), Department of State Services

(DSS), Centre for Energy Research and Training (CERT), Zaria, Gamma Irradiation Facility (GIF) Sheda, Abuja, EKO Hospital, Lagos, University College Hospital (UCH) Ibadan, Ahmadu Bello University Teaching Hospital (ABUTH), Zaria, and Nigerian Nuclear Regulatory Authority (NNRA)

3.3.7.3.2. Pilot National Training Course on Alarm Response for Nuclear and Radiological Stakeholders in Nigeria Lagos- 14th – 17th May 2018

As an outcome of the earlier Workshop on train the trainer workshop, customized training course modules were developed. The training modules were then sent to PNNL for comments. Finally the first pilot training course was officially held in Lagos from 14th to 17th May 2018 for the South-West Region. The objective of the training course was to introduce the participants to the indigenized alarm response training modules that are specific to NNRA's regulatory requirements, Nigeria response protocol and radiological facilities and activities. Twenty two (22) participants from the Nigeria Police Force (NPF), Nigeria Security and Civil Defence Corps (NSCDC), Department of State Services (DSS), EKO Hospital, Lagos, University College Hospital (UCH) Ibadan, Nigerian Customs Service (NSC), National Emergency Management Agency (NEMA), Lagos State Emergency Management Agency (LASEMA), National Fire Service (NFS), National Institute for Radiation Protection and Research (NIRPR), Ibadan, NNRA South-West Zonal Office and Nigerian Nuclear Regulatory Authority (NNRA) participated.

3.3.7.4. National Transport Security Response Workshop, Lagos, 19th – 21st August 2019

The NNSA Office of Radiological Security (ORS) recognizing that transportation is often the most vulnerable phase in the life cycle of radioactive material embarked on a transport security project which provides an integrated transportation security support for all ORS activities. This project also supports global material security in implementing uniform transport security program throughout the world. It involves assessment of transport security culture and programmes at national and operator level so as to identify the gaps and weaknesses and proffer solutions for bridging the gaps. It was on this premise that ORS through its technical consultants from the Oak Ridge National Laboratory (ORNL) conducted transportation security assessment of radiological material in Nigeria from 30th April to 3rd May 2018. The objective of the visit was to conduct an assessment of transportation security regime for radioactive material in Nigeria. Some of the expected outcomes of the meeting were to make recommendations for possible upgrades, develop standardization upgrade suits for use in Nigeria and provide transportation security awareness and detailed training to all the relevant stakeholders in the country.

The meeting was held in Abuja, Lagos and Port-Harcourt. The Meeting comprised a brief presentation from the Transportation Expert from Oak Ridge National Laboratory,

interrogation of the operating organization and the government agencies present on how transportation of radioactive material is conducted and general discussions.

The participation was drawn from Nigeria Police Force, (Explosive Ordinance Disposal Unit); Nigeria Customs Service (NSC), Nigeria Ports Authority (NPA), Federal Airport Authority (FAAN) Transportations Companies for Radioactive Material, Freight Forwarding Agents and the Nigerian Nuclear Regulatory Authority (NNRA).

3.3.8. FUNCTIONAL AREA 6: SUSTAINING STATE'S NUCLEAR SECURITY REGIME

3.3.8.1 *Establishment of Nuclear Security Centre*

Nigeria realized the need for large number of stakeholders to be trained locally since the Regional and International trainings course offered by the IAEA and other international partners can only accommodate few Therefore the need to build local capacity in technical and scientific support in order to ensure sustainability informed Nigeria decision to establishment of Nuclear Security Centre with the mandate to build national capacity in technical and scientific support for nuclear security by training all relevant national stakeholders on nuclear security.

3.3.8.2 National Human Resource Development (HRD) workshop

Nigeria conducted One-day seminar for Senior Managers on Management Roles, Responsibilities and Ownership for HRD and a four-day workshop on HRD in the field of nuclear security in Abuja in August 2019 with IAEA support.

National Workshop on establishing sustainable training programme and on Instructor Selection, Training, Qualification and Development is being planned for 2020 and plans are underway to introduce nuclear security awareness modules in the training programs of existing academies and training institutes in the country.

4. CONCLUSIONS:

The Integrated Nuclear Security Support Plan (INSSP) is an effective tool in implementing effective nuclear security regime in Nigeria. Significant milestones have been conceived and achieved through the INSSP. The INSSP ensures that resources are wisely utilized as nuclear security needs are identified, prioritized and consolidated in a document and systematically implemented.

Through the INSSP, Nigeria has established improved national coordination for nuclear security as the Office of National Security Adviser is now responsible for coordinating nuclear security at the national level. Additionally, the recent NSDA effort is enhancing national nuclear security coordination.