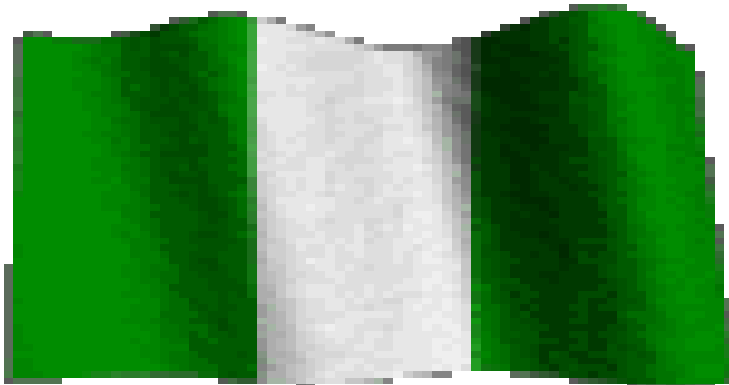




CONVENTION ON NUCLEAR SAFETY



NIGERIAN NATIONAL
REPORT FOR THE 7TH
REVIEW MEETING

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Fig. 1: Map of the Federal Republic of Nigeria

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List of Abbreviations

BOOT	Build-Own-Operate and Transfer
CERT	Centre for Energy Research and Training
CNS	Convention on Nuclear Safety
ECN	Energy Commission of Nigeria
EPREV	Emergency Preparedness Review
FEC	Federal Executive Council
FNRBA	Forum of Nuclear Regulatory Bodies in Africa
FTP	Foreign Technical Partner
HRD	Human Resource Development
IAEA	International Atomic Energy Agency
IGA	Inter-Governmental Agreement
INIR	Integrated Nuclear Infrastructure Review
JSC	Joint Stock Company
NE	Nuclear Energy
NEPIC	Nuclear Energy Programme Implementation Committee
NAEC	Nigeria Atomic Energy Commission
NEMA	National Emergency Management Agency
NERC	National Electricity Regulatory Commission
NESREA	National Environmental Standards and Regulations Enforcement Agency
NNRA	Nigerian Nuclear Regulatory Authority
NNRERP	National Nuclear and Radiological Emergency Response Plan
NPI	Nuclear Power Infrastructure
PHCN	Power Holding Company of Nigeria
PPA	Power Purchase Agreement
RCF	Regulatory Cooperation Forum
SPV	Special-Purpose-Vehicle
TSO	Technical Support Organization

1. INTRODUCTION

This report is issued according to Article 5 of the Convention on Nuclear Safety (CNS). Nigeria is not a nuclear State according to the terms of the CNS. However, this report will further give a brief overview of the nuclear research activities going on in the country and some brief comments on how the different Articles are applied to that activity. Considering also the fact that Nigeria has taken a national decision to harness electricity from nuclear power, the report shall provide an overview of the steps being taken in preparation for same.

2. OVERVIEW OF THE DEVELOPMENT OF NUCLEAR POWER PROGRAMME

The activities leading to the development of the nuclear power programme dates back to 1976 when the Nigeria Atomic Energy Commission Act No.46 of 1976 was promulgated. The Act No. 46 created NAEC which however was not operational until July, 2006 with the appointment of its pioneer Director-General. Nevertheless, prior to NAEC's full activation, manpower training and capacity building were being implemented through, two university-based nuclear energy centres established in 1978 in Obafemi Awolowo University, Ile-ife and Ahmadu Bello University, Zaria. A third national Centre, the Nuclear Technology Centre was established in 1991 at the Sheda Science and Technology Complex, Abuja. As a component of the national human resource development programme after the activation of NAEC, three additional university-based nuclear energy Centres have also been established at University of Port Harcourt, University of Maiduguri and Federal University of Technology, Owerri.

For the purpose of energy planning, the Energy Commission of Nigeria (ECN) was created by Decree 62 of 1979 and was mandated to enunciate the national energy policy, taking into consideration the national energy needs, the available resources and how best to exploit them on a long-term basis to meet the national needs.

For regulation and licensing, the Nigerian Nuclear Regulatory Authority (NNRA) was created by the Nuclear Safety and Radiation Protection Act No. 19 of 1995, and mandated to regulate all nuclear activities in the country, including the enforcement of all nuclear laws and regulations. It was activated and became operational in May, 2001.

2.1 National Decision Process

Nigeria, for decades, has been involved in many peaceful applications of nuclear science and technology. The areas of application include agriculture and food security, medicine and human health, water resources management, industry, and in environmental management, as well as in basic and applied scientific research. However, due to inadequacy of electricity supply, the Federal

Government in its effort to improve the energy generation in the country inaugurated an Inter-Ministerial Committee on Energy Resources in April, 2004. This committee assessed and quantified all the major energy resources in the country. The study documented the various resources; natural availability, estimated derivable electricity, level of exploitation and business opportunities. Nuclear energy was identified as a major potential source and was recommended for consideration by the Federal Government of Nigeria. Also, this recommendation was further affirmed through analytical studies using appropriate modelling tools by the ECN in 2006.

Deployment of nuclear power plants was also seen as a national strategy for diversifying the energy mix as well as optimally managing the exploitation of the available fossil fuels in the country, which would ensure sustainable development. In this regard, it was expected that revenues from the oil and gas sector could be invested to develop and harness other energy resources, including nuclear.

2.2 Development, Approval and Adoption of the National Nuclear Power Roadmap

Sequel to this, the National Council of Science and Technology, during its meeting in Lafia, Nassarawa State in 2004, directed the relevant stakeholder institutions within the aegis of the Federal Ministry of Science and Technology to develop a nuclear roadmap for the country. A draft roadmap was submitted to the Honourable Minister of Science and Technology in March, 2005. Consequently, in June 2005, another Inter-Ministerial Committee was inaugurated to evaluate the feasibility of launching a national programme to deploy nuclear power for electricity generation in the country. The committee's report was favourable and this eventually culminated in the activation of the NAEC in 2006.

Consequently, the NAEC was charged with the responsibility of developing Technical Framework for the development and deployment of nuclear power plants for electricity generation in the country. The technical framework consisting of three phases namely:

- i Manpower training and infrastructure development;
- ii Design certification, regulatory and licensing approvals; and
- iii Construction and start-up

was approved for implementation by the Federal Government in February, 2007. The National Strategy for its implementation was finalized and approved in December, 2009.

In order to strategically position the Commission to implement its mandate, particularly, the approved nuclear power programme, it was reconstituted in conformity with the enabling Act as a full-fledged Commission in March 2011. It

is worthy of note that, by its enabling Act, NAEC is mandated as the national focal agency to implement the national nuclear power programme. Consequently, NAEC can operate as an Owner/Operator organization. Therefore, the organizational structure of NAEC has been developed to optimize building of adequate technical capacity and competencies, so as to effectively build the requisite Nuclear Power Infrastructure (NPI).

2.3 National Institutional Framework

In recognition of the multifaceted nature of a nuclear power programme, the sustainable and successful implementation of the programme entails full participation of several other national stakeholder institutions. In this regard, the main stakeholder institutions for the planning, management and implementation of the National Nuclear Power Programme are as indicated below:

- i The NAEC which is mandated as the national focal institution for atomic energy development in Nigeria. Under its supervision, Six nuclear energy research centres operate and are involved in manpower training and capacity building;
- ii The Nigerian Nuclear Regulatory Authority (NNRA) is the national nuclear regulator; established by Act 19 of 1995, became operational in 2001. Empowered to licence and regulate the operations of the nuclear power industry and the use of radioactive sources; Has a national institute for radiation protection and research which is involved in manpower training;
- iii The Energy Commission of Nigeria (ECN) - responsible for energy policy and planning;
- iv The National Electricity Regulatory Commission (NERC) - electricity pricing;
- v The National Environmental Standards and Regulations Enforcement Agency (NESREA) – for environmental protection; and
- vi The National Emergency Management Agency (NEMA) – emergency planning and management.

These agencies and institutions constitute the Nuclear Energy Programme Implementation Committee (NEPIC). Each of these institutions performs specific roles and responsibilities in conformity with their statutory mandates.

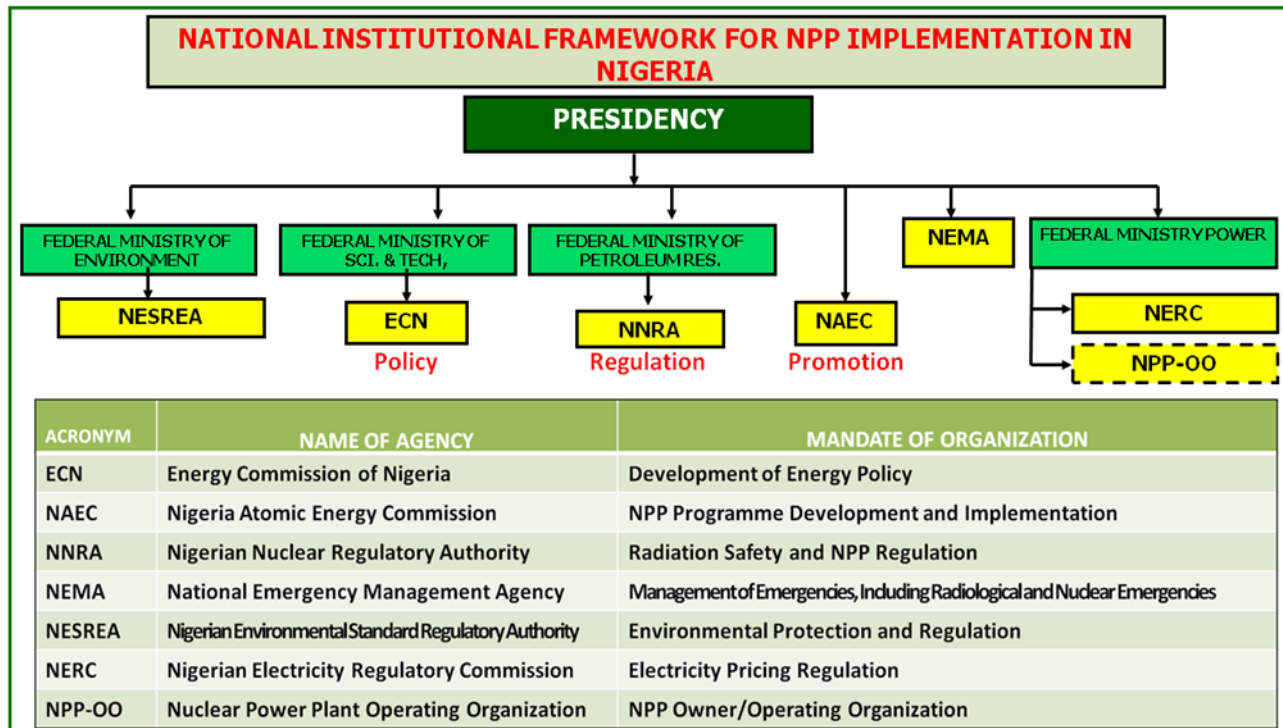


Figure 2: National Institutional Framework

2.4 Progress

In 2006, the Nuclear Safety and Radiation Protection Act No. 19 of 1995 was, with the assistance of the IAEA, reviewed ensuring comprehensive inclusion of national obligations and commitments to ensure robust implementation of the programme.

For the purpose of site licensing, the NNRA working with other stakeholder organizations including NAEC, has finalized the Draft Nigerian Regulation *for Licensing of Sites for Nuclear Installations*.

In planning for the back-end of the nuclear fuel cycle, and the need for a robust and safe nuclear waste management, NAEC working with other national stakeholders including the NNRA, has finalized the National Policy on Radioactive Waste Management.

As part of the national obligation to the 1963 Vienna Convention on Civil Liability for Nuclear Damage, a framework for the establishment of a *National Nuclear Insurance Policy and Scheme* to adequately address the civil liability component of the nuclear power industry has been finalized for approval. The framework adopts the 1997 Protocol to the Vienna Convention.

Human Resource Development (HRD) is a pivotal element of successfully implementing a nuclear power programme. Thus, part of our national strategy is the emplacement of the critical educational and training infrastructure for the development the national NPI; where the nuclear energy research centres and national educational institutions are partners. In this regard, we have finalized the requisite HRD strategy in line with the workforce requirements of the national NPP programme.

Nigeria recognizes the importance of multilateral and bilateral cooperation in the application of nuclear technology. In this regard, we have strengthened our cooperation and partnership with the IAEA and other development partners for the implementation of the national nuclear power programme.

The signing of Cooperation Agreements with the Russian Federation, and their subsequent approval and ratification by the Federal Executive Council (FEC), as well as on-going consultations with other countries, are in furtherance of our strategy for international cooperation.

Preliminary site selection activities started in 2007 with visits to seven designated areas. After preliminary evaluation and ranking, significant refinements were made and through by technical elimination, two preferred sites emerged. These are located at Geregu in Ajaokuta LGA of Kogi State and Itu LGA of Akwa Ibom State. On the approval of the Federal Government, further detailed evaluation and characterization studies will be conducted on these sites with the participation of a technical partner. Application for the licensing of the approved site(s) will be made within the year.

The Federal Government is implementing a national program to strengthen and stabilize the transmission grid for the effective evacuation of power from the on-going NIPP projects. The plan envisages that by 2026, the grid will be positioned to accommodate at least 30,000 MWe. This grid expansion and enhancement is expected to accommodate the first NPP when it comes online in the early 2020s.

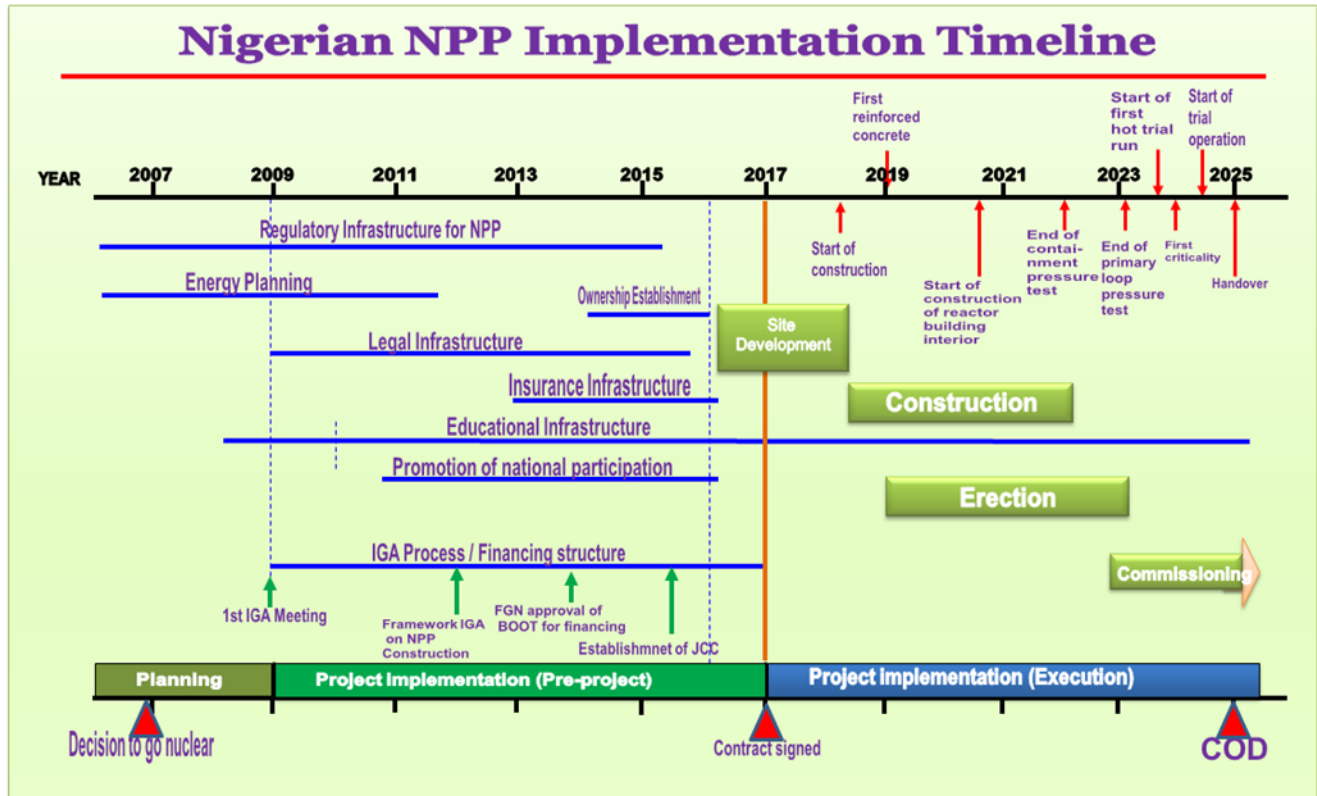


Fig. 3 – NPP Implementation Timeline

2.5 Approved Financing Plan

The Federal Government through the Power Sector Reform Act of 2005 disengaged from direct involvement in power generation. Consequently, the Power Holding Company of Nigeria (PHCN), which was then the government power monopoly was unbundled and privatized. In line with this policy, the FGN will not take full ownership of a Nuclear Power Plant. Nevertheless, it is funding all elements of NPI development.

Government Commitment and the National ability to fund NPI development is a critical determinant of success: key to attract vendor/utility/private sector financing of the Nuclear Power Plants (NPPs). In so doing, the FGN is creating the enabling environment for NP programme sustainability.

The FGN has decided to finance the construction of nuclear power plants through a Build-Own-Operate and Transfer (BOOT) contractual arrangement through the establishment of a Special-Purpose-Vehicle (SPV) in the form of a "Joint Stock Company" (JSC), created in accordance with national laws and corporate governance with a Foreign Technical Partner (FTP).

The JSC FTP will be an experienced NPP vendor and/or a NPP utility and is expected to hold majority and controlling stake. The roles of the JSC FTP and the National Minority shareholders will be specified in contractual agreements. The FGN and the Government of the FTP country will enter into an Inter-Governmental Agreement (IGA) to streamline the modalities of the ownership structure and financing of the project. The Federal Government will provide financial guarantees to facilitate the success of the BOOT arrangement through the creation and entering into enforceable advance Power Purchase Agreements (PPAs).

2.6 Highlights of Integrated Nuclear Infrastructure Review (INIR) Mission

In line with international best practices, in 2012 the Federal Republic of Nigeria requested the IAEA to conduct an INIR Mission to:

- i Evaluate the development status of the 19 infrastructure issues described in the NE Series Guide (NG-G-3.1) “Milestones in the Development of a National Infrastructure for Nuclear Power”;
- ii Identify the areas of the infrastructure needing further action to reach respective milestones in the building of national infrastructure;
- iii Provide recommendations and suggestions regarding infrastructure development which can be used in preparation of an Action Plan to address areas for further improvement.

The Mission which was conducted in June 2015 noted that Nigeria is making progress in the infrastructure needed to reach the requisite milestones. More notable to the Mission are areas where the experience with other nuclear facilities has contributed to the planning for nuclear power. Additionally, to further assist in national efforts, the Mission made 43 recommendations and 10 suggestions to Nigeria. In these regards, Nigeria has developed an Action Plan for the full implementation of the findings of the Mission.

3. IMPLEMENTATION OF THE CNS

With Nigeria’s expression of political commitment in 2005 to harness nuclear energy for electricity generation, there arose the need for the country to demonstrate the peaceful and transparent nature of our nuclear power programme. Thus in July 2005, the Nigerian Nuclear Regulatory Authority in conjunction with the Ministry of Foreign Affairs and the Federal Ministry of Science and Technology organized the **First National Seminar on Nuclear Non-Proliferation Treaty - Challenges and Opportunities**. Part of the recommendations of the National Seminar was for Nigeria to, as a matter of priority, ratify the CNS amongst others. **Consequently, Nigeria ratified the CNS in 2007**. Nigeria is also party to the following amongst others:

- i Nuclear Non-proliferation Treaty (NPT)
- ii Comprehensive Safeguards Agreement (CSA)

- iii Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in Case of a Nuclear or Radiological Emergency
- iv Additional Protocol to the Safeguards Agreement
- v Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
- vi Convention on the Physical Protection of Nuclear Materials and its amendment
- vii Instrument of Acceptance of the Agreement on the Privileges and Immunities of the International Atomic Energy Agency
- viii Protocol Additional to the Agreement between the Federal Republic of Nigeria and the International Atomic Energy Agency for the Application of Safeguards
- ix Convention on Civil Liability for Nuclear Damage

The obligations under the CNS cover:

- i Review of safety of existing nuclear installations
- ii Establishment of legislative and regulatory framework, establishment of regulatory body and responsibility of the license holder.
- iii General safety considerations for priority to safety, financial and human resources, human factors, quality assurance, assessment and verification of safety, radiation protection and emergency preparedness.
- iv Safety of installations during siting, design & construction and operation.

3.1. Implementing Procedure: Legislative and Regulatory Framework

Provisions of Articles 4 - 8 of the CNS which requires as follows:

Article 4 requires that *“Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention”*.

Article 7 requires that *“Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations”*. *The legislative and regulatory framework shall provide for:*

- i the establishment of applicable national safety requirements and regulations;
- ii a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence;
- iii a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;
- iv the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation”

In the above regards, Nigeria in 1995 promulgated the **Nuclear Safety and Radiation Protection Act (Act)**, which established the **Nigerian Nuclear Regulatory Authority (NNRA)**. The Act also charged and empowered the NNRA with the mandate of **nuclear safety and radiological protection**

regulation and to perform all necessary functions to enable Nigeria meet its national and international safeguards and safety obligations in the application of nuclear energy and ionizing radiation as well as regulate the safe promotion of nuclear research and development and the application of nuclear energy for peaceful purposes.

With Nigeria's accession to the CNS and the other listed instruments on **nuclear safety, security, physical protection, safeguards and radioactive waste/spent fuel management**, there arose the need to domesticate the provisions of these instruments. Nigeria vide a Technical Cooperation Agreement with the IAEA therefore reviewed the Act in 2006, culminating in the production of the **Nuclear Safety, Security and Safeguards Bill (NSSS Bill)**, currently before the National Assembly for passage into law. Amongst others, the Bill seeks to domicile in Nigeria, our national obligations under the newly and previously ratified international treaties on Nuclear Safety, Security and Safeguards. Additionally, the NSSS Bill make provisions for the establishment of a licensing procedure for nuclear installations. Section 32 provides as follows:

"(1) No source or practice involving exposure of man to ionizing radiation shall be authorized, except through a system of application notification, registration or licensing established by the Authority.

(2) Any person who intends to undertake any activity, action, step or event mentioned in this Act, shall, prior to any such activity, action, step or event:

- a) apply in the prescribed form to the Authority for such a licence; and*
- b) furnish such information as the Authority may, from time to time, require."*

Also, Section 25 provide thus:

- 1) "No person shall site, construct, commission, operate, or decommission a nuclear installation without a licence issued by the Authority in accordance with this Act and the regulations made thereunder;*
- 2) Upon receipt of an application under subsection (1) of this section, the Director of the relevant Department or any other officers directed by him shall inspect the site to which the application relates and carry out such other investigations as required in section 39 of this Act;*
- 3) No vessel that is propelled by nuclear power or which has on board any nuclear material capable of causing nuclear damage shall:
 - a) anchor or sojourn in the territorial waters of Nigeria; or*
 - b) enter any port in Nigeria unless with a nuclear vessel licence issued by the Authority.**
- 4) No aircraft which is propelled by nuclear power or which has on board any nuclear material capable of causing nuclear damage shall:
 - a) overfly the airspace of Nigeria; or*
 - b) land at any airport in Nigeria; or*
 - c) discharge its nuclear or radioactive material unless it is so authorized by the Authority.**

- 5) *The Authority shall require the applicant for a licence to site a nuclear facility to perform a baseline survey of the site, including environmental impact assessment, radiological conditions prior to construction so as to develop information for comparison at any time during the operation of the facility and during incident or end life/decommissioning;*
- 6) *The Authority shall convene public hearing on any application to site a nuclear installation in any part of the Federation;*
- 7) *At the design stage of a nuclear facility, the applicant for an authorization to construct and operate a nuclear facility shall prepare commissioning and decommissioning plans for approval by the Authority;*
- 8) *An applicant for an authorization to construct and operate a nuclear installation shall:*
 - a) *demonstrate to the Authority that adequate financial resources shall be available to cover the costs associated with safe decommissioning, including the management of resulting waste;*
 - b) *provide financial assurances before initial operation of an installation is authorized;*
 - c) *review and update the financial requirements to ensure proper decommissioning as may be required by the Authority.*
- 9) *The Authority shall submit a copy of any authorization granted pursuant to subsection (1) of this section to:*
 - a) *the relevant State that is likely to be affected by the activity, action or step of the applicant; or*
 - b) *such other persons and agencies that are likely to be affected as the Authority may, from time to time, determine.*
- 10) *Any person who is likely to be affected by the granting of a nuclear installation licence pursuant to subsection (1) of this section shall make representation to the Authority relating to the health, safety and environmental issues connected with the application within 30 days of the date of submission of the application pursuant to subsection (2) of this section.*
- 11) *Where the Authority is of the opinion that further public hearing or inquiry is necessary it shall arrange for such hearing or inquiry to consider health, safety security or environmental issues, as may be determined, from time to time."*

"26. The Authority may at any time during the construction of an installation, request such information as it deems necessary to evaluate the health, safety, security or environmental aspects of the construction and future operation of the installation".

Where there are contraventions of any provisions of the law, the provisions contained in the NSSS Bill provides thus:

"42. (1) Without prejudice to section 74 of this Act, the Authority shall impose administrative charges, confiscate materials, seal premises, seize or close down any authorized or unauthorized activities upon the findings of the report made pursuant to section 41 of this Act.

(2) The Authority shall revoke the licence of any person if there is a gross violation of the conditions prescribed in the licence or of repeated non-compliance pursuant to section 39 of the provisions of this Act.

(3) All expenses incurred by the Authority in the process of confiscation, sealing, seizure or closure as a result of non-compliance shall be the responsibility of the licensee or the violator of the Act, if not licensed”.

“74. (1) A person who contravenes any of the provisions of this Act, or does not comply with a limitation or condition subject to which he is authorised under this Act is guilty of an offence and liable on conviction to a fine of not less than N1,000,000 or more than N3,000,000 or to imprisonment for a minimum term of not less than 1 years or more than 2 years or to such fine and imprisonment

(2). Any person who imports or exports any radioactive source without a licence from the Authority, commits an offence and shall:

- a) in the case of an individual, be liable on conviction to imprisonment for a term of not less than 2 years or not more than 5 years or an option of fine of not less than N2,000,000 or not more than N5,000,000, or to both such fine and imprisonment; or*
- b) in the case of a body corporate, be liable on conviction to a fine of not less than ₦10,000,000 or not more than N20,000,000; or*
- c) all the directors or officers of the body corporate shall each be liable to imprisonment for a term of not less than 2 years or for not more than 5 years.*

(3) Any person being an operator of radiological facility under this Act, who fails to take measures to secure any radioactive source in such manner as to result in unauthorised access, theft or loss of control of such sources, commits an offence and shall:

- a) in the case of an individual, be liable on conviction to a fine of not less than N2,000,000 or not more than N5,000,000 or to imprisonment for a term of not less than 2 years or not more than 5 years or to both such fine and imprisonment; or*
- b) in the case of a body corporate, be liable on conviction to a fine of not less than ₦10,000,000 or not more than N20,000,000; and*
- c) all the directors or officers of the body corporate shall each be liable to imprisonment for a term of not less than 2 years or for not more than 5 years.*

(4). Any person who imports or exports any nuclear material or prescribed substances without a licence from the Authority, commits an offence and shall:

- a) in the case of an individual, be liable on conviction to imprisonment for a term of not less than 5 years or not more than 10 years or an option of fine of not less than N5,000,000 or not more than N10,000,000, or to both such fine and imprisonment; or*
- b) in the case of a body corporate, be liable on conviction to a fine of not less than ₦20,000,000 or not more than N40,000,000; or*
- c) all the directors or officers of the body corporate shall each be liable to imprisonment for a term of not less than 5 years or for not more than 10 years*

(5) Any person being an operator of nuclear installation under this Act, who fails to take measures to secure any nuclear material in such manner as to result in unauthorized access, theft or loss of control of such materials or sources, commits an offence and shall:

- a) in the case of an individual, be liable on conviction to a fine of not less than N20,000,000 or not more than N40,000,000 or to imprisonment for a term of not less than 5 years or not more than 10 years or to both such fine and imprisonment; or*
- b) in the case of a body corporate, be liable on conviction to a fine of not less than N100,000,000; and*
- c) all the directors or officers of the body corporate shall each be liable to a fine of not less than N20,000,000 or imprisonment for a term of not less than 5 years or to both such fine and imprisonment.*

(6) Any person who carried out any activity referred to in this Act and at the end of the activity abandoned, decommissioned or rehabilitated the installations thereof without a licence issued by the Authority commits an offence punishable in accordance with this Act as follows:

- a) in the case of an individual, be liable on conviction to a fine of not less than N2,000,000 or not more than N20,000,000 or to imprisonment for a term of not less than 2 years or not more than 10 years or to both such fine and imprisonment; or
- b) in the case of a body corporate, be liable on conviction to a fine of not less than N10,000,000 or not more than N50,000,000; or
- c) all the directors or officers of the body corporate shall each be liable to a fine of not less than N5,000,000 or not more than N20,000,000 imprisonment for a term of not less than 5 years or not more than 10 years or to both such fine and imprisonment.

(7) Any person who contravenes the provisions of section 37 commits an illicit trafficking offence and shall be liable on conviction:

- a) in the case of an individual, to a fine of not less than N10,000,000 or not more than N20,000,000 or to imprisonment for a term of not less than 10 years or not more than 15 years or to both such fine and imprisonment; or
- b) in the case of a body corporate, to a fine of not less than N50,000,000 or not more than N100,000,000; and
- c) in addition, directors or officers of the body corporate shall each be liable to a fine of not less than N30,000,000 or not more than N50,000,000 or to imprisonment for a term of not less than 15 years or not more than 25 years or to both such fine and imprisonment.

(8) A consignor, consignee, transporter and/or freight forwarder (by air, land or sea) of nuclear materials, radioactive materials or wastes that breaches the provisions of section 55 of this Act commits an offence and shall be liable financially or otherwise for all incidents or accidents during transportation or storage in transit of the nuclear materials, radioactive sources and/or wastes.

(9) Notwithstanding the provisions of section 55, the operator of a facility or carrier of nuclear materials, radioactive materials or waste, who is responsible for an incident or accident resulting in radioactive contamination of the environment shall be liable on conviction, for the restoration of the environment or for the cost of such activities as are necessary for the restoration of the environment to its original state.

(10) Any person who contravenes the Non-proliferation status of Nigeria as provided for in section 66 of this Act commits an offence and shall be liable on conviction to a fine of N50,000,000 or a term of imprisonment of 35 years or to both such fine and imprisonment.

(11) Any person who sabotages the safety or security of any nuclear installation, nuclear material or other radioactive material in use, storage or transportation or who sabotages any detection equipment such that the act endangers or is likely to endanger national security or poses danger to health or the environment, commits an offence and shall:

- a) in the case of an individual, be liable on conviction to a term of imprisonment of 25 years without an option of fine; or
- b) in the case of a body corporate, the directors or officers of the body corporate shall be liable on conviction to a term of imprisonment of 25 years without an option of fine”.

Additionally, the licensing procedure was further reiterated in the draft Nigerian Regulations for the Siting of Nuclear Power Plants. Particularly, regulations 10-12 provide thus:

“The applicant for a licence to site an NPP shall file an application for authorization with the Authority in the form as may be prescribed by the Authority.

11. *Licensing procedure for NPP in Nigeria shall comprise of the following stages:*

- i. *Licensing of Site*
- ii. *Licensing of Design and Construction*
- iii. *Licensing of Commissioning*
- iv. *Licensing of the Operation, and*
- v. *Licensing of Decommissioning*

12. *The applicant shall submit different applications for each stage in regulation 11 which applications shall comply with the applicable filing requirements as may be laid down by the Authority”.*

Nigeria has also drafted the following regulations in addition to the Regulations on Licensing Sites for NPP:

- i. Draft Nigerian Regulations on the Physical Protection of Nuclear Material and Nuclear Facilities
- ii. Draft Regulations on Nigerian System of Accounting for and Control of Nuclear Material

Additionally, the NNRA, in collaboration with Security Agencies, recently reviewed Nigeria’s Design Basis Threat (DBT) document for nuclear and other radioactive material in the country, thus strengthening physical protection infrastructure in the country.

3.2 Regulatory Body

Article 8 requires that “Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities” and

“Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy”.

As indicated earlier, Nigeria established the NNRA in 2001 and the NNRA has emplaced a regulatory infrastructure within the context of the Act to effectively fulfil its regulatory functions. The NNRA has been able to carry out its mandate through a system of registration, licensing and inspection of practices involving ionizing radiation and the enforcement of compliance with the provisions of the Act.

The independence of NNRA and in consequence its regulatory decisions are ensured by placing the NNRA under the supervision of a governmental ministry independent from other institutions that use and/or apply ionizing radiation.

NNRA is financed from government appropriation through national budgetary allocations and from services rendered by the Authority. Sections 12 (2) (a) and (b) of the Act respectively covers sum that is provided by the Federal Government through budgetary provisions and sums accruing to the Authority from services rendered.

Furthermore, NNRA has taken necessary measures to have in place the basic administrative and technical capability to support its activities, through the following Departments based on Section 9 (1) of the Act:

- i Nuclear Safety, Physical Security and Safeguards
- ii Radiological Safety
- iii Authorization and Enforcement
- iv Administration and Finance, and
- v National Institute of Radiation Protection and Research – TSO.

The NNRA received IAEA Expert Mission to Review the current status of Regulatory Infrastructure for Safety of NPP at the NNRA from 10th – 13th September 2012. The Mission addressed issues bordering on Safety, Leadership and importantly human resource development. Also, the NNRA hosted an IAEA Workshop on Regulatory Framework and Licensing Process in Nigeria from 9th – 13th December 2013.

Additionally, Nigeria has requested an Integrated Regulatory Review (IRRS) Mission to peer review the status of the regulatory infrastructure for radiation as well as nuclear safety. A pre-IRRS Mission was held in June 2016 with the Mission proper scheduled for March 2017. A preparation for the Mission is ongoing and the IAEA SARIS platform forms the basis for all preparations.

3.3 Development and Maintenance of Human Resources

Article 11 (2) requires that “Each Contracting Party shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training, retraining are available for all safety related activities in or for each nuclear installation throughout its life”.

Although, Nigeria has no NPP, it however has an IAEA Technical Cooperation Project – Developing Human Capacity for Regulating NPP in Nigeria (NIR 9/010). Under this project, the following had been carried out:

- i. Basic Professional Training Course on Nuclear Safety based on the IAEA Syllabus was conducted in Nigeria from 8th – 19th June 2009 with 27 NNRA staff participating

- ii. Licensing of New NPP Projects and Special On-the-Job Training for Regulatory Inspection of NPP in May 2009 at the International Nuclear Safety School, Korea Institute of Nuclear Safety (KINS) with 4 NNRA staff participating
- iii. IAEA Fellowship Programme in Nuclear Science – MSc in Nuclear Engineering at the University of Manchester, UK from September 2009 – September 2010 for 1 NNRA Staff
- iv. National Training Course on Authorization, Licensing, Review and Assessment for NPPs from 6th – 17th December 2010 with 30 NNRA staff participating
- v. IAEA Expert Mission on Training Needs Assessment based on IAEA TECDOC 1254 from 6th – 8th September 2010
- vi. IAEA Fellowship Programme on the Implementation of Regulatory Oversight in the Licensing, Review and Assessment of NPP at the National Nuclear Regulator, South Africa in 2012 with 1 NNRA staff participating.

The NNRA hosted an IAEA Expert Mission – Training Workshop on Human Resource Development, 17th - 21st December 2012 which centred on the Determination of Human Resource Needs, Systematic Assessment of Competence Needs, Systematic Approach to Training and Human Resource Sustainability. To build on the gains of these Missions, the NNRA commenced a gap analysis and the development of its Human Resource Development Programme using the IAEA SARCON Tool. At the end of this exercise, a well structured plan for building capacity for nuclear safety and indeed the nuclear power programme was developed.

The NNRA Human Resource Development Programme is based on core functional areas. One of the objectives of training is to develop the skills and knowledge of the staff in order to widen their appreciation of the work being undertaken by themselves as well as others. The training programme consist of a combination of self-study, formal training courses, workshops and fellowship organized by NNRA, academic or professional organizations, regulatory bodies of other countries or by the IAEA and on the job training in the Country or abroad.

The NNRA training strategy is built on short, medium, and long-term goals. In the near term, the NNRA recognizes that it needs to recruit the requisite number of qualified staff to establish a comprehensive legal and regulatory framework for the civil nuclear sector, and conduct all licensing procedures and inspections. These staff, much of which are already in place, are drawn from different field of science, engineering and administration.

In the medium term, NNRA plans to develop a skilled cadre of Nigeria nationals to take on an increasing number of responsibilities as the regulator while seeking for a significant element of technical support organization and consultants. In the longer term, the NNRA sees its workforce consisting predominantly of Nigeria professionals with support from international experts.

In its plans for developing its domestic workforce, NNRA is basing its strategy closely on technical advice from the IAEA, and particularly the competency framework outlined by IAEA TECDOC 1254. The strategy is based on four main technical areas for which staff need to be trained: security, safeguards, radiation safety, and nuclear safety; as well as three knowledge levels:

Basic Level: providing the basic concepts and principles of safety, security and safeguards. Basic level training requires trainees to attend both internal and external programs. The training includes Basic Professional Training Course (BPTC), two week training in Center for Energy Research and Training, in-house training in fundamental of nuclear engineering, Post Graduate Diploma in Nuclear Safety (NIRPR Ibadan), a master’s degree in Nuclear Science and Engineering program from universities the NNRA intended to have formal partnership with such as the Korean Institute for Nuclear Safety (KINS); the Korea Advanced Institute of Science and Technology (KAIST); Russian Universities; and the ongoing plan to include understanding of health safety and environment for some carder of staff.

Specialized Level: preparing staff to conduct tasks of limited complexity under the supervision of a more senior staff. Specialized training is built around several qualification programs under development include an Inspector Qualification Programme, Safety Assessor Qualification Programme, a Security Qualification Programme, Safeguards Qualification Programme, and a training program for Emergency Preparedness and Response.

Advance Level: preparing the staff to perform tasks under their own responsibility in an independent way. Advance level training is centered on the concept of on-the-job training and fellowship program. These programmes shall be held in institutions of comparative advantages and experience where the NNRA have cooperation. The on-the-job training and fellowship are supported by partnership institution wide mentoring programme through which staff are assigned a more senior mentor within the partner organization, who prepares a work plan, assists the mentee in setting developmental goals, and provides feedback to the mentee on a quarterly basis.

	Operations Areas			
Knowledge Level	Security	Safeguards	Radiation Safety	Nuclear Safety
Basic (3 years)	NNRA familiarization and induction program In-house-training Postgraduate Diploma Master’s Degree Program			
Specialized (3 years)				
Advanced (3 years)	On-the-job Training Technical Workshops	On-the-job Training Technical Workshops	On-the-job Training Technical Workshops	On-the-job Training Technical Workshops

Figure 4: An overview of NNRA knowledge framework

Furthermore, as part of the training plan for staff, there is a 2-week attachment training on the Nigerian Research Reactor. This training consists of theoretical (basic reactor physics, thermal hydraulics, reactor operation systems etc) and practical experience.

Additionally, Nigeria is cooperating with the European Commission in the INSC Project MC.03/10 titled "Training and Tutoring for Experts of Nuclear Regulatory Authorities and their TSOs for Developing or Strengthening their Regulatory and Technical Capabilities". This project assists in capacity development in the NNRA.

3.4 Licensing Procedure

Article 17 requires that "Each Contracting Party shall take the appropriate steps to ensure that appropriate procedures are established and implemented:

- i for evaluating all relevant site-related factors likely to affect the safety of a nuclear installation for its projected lifetime**
- ii for evaluating the likely safety impact of a proposed nuclear installation on individuals, society and the environment**
- iii for re-evaluating as necessary all relevant factors referred to in sub-paragraphs (i) and (ii) so as to ensure the continued safety acceptability of the nuclear installation**
- iv for consulting Contracting Parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing the necessary information to such Contracting Parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation.**

Under regulation 14 of the draft Nigerian Regulations for the Siting of NPP, a prospective licensee is required to provide as part of his application, the following information:

"(1). A Site Safety Analysis Report (SAR), which shall include:

- a) specific number, type, and thermal power level of the facilities, or range of possible facilities, for which the site may be used;*
- b) anticipated maximum levels of radiological and thermal effluents from each facility;*
- c) type of cooling systems, intakes, and outflows that may be associated with each facility;*
- d) boundaries of the site;*
- e) proposed general location of each facility on the site;*
- f) seismic, meteorological, hydrologic, and geologic characteristics of the proposed site with proper consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and period of time of gathering the historical data;*
- g) location and description of nearby industrial, military, or transportation facilities and routes;*
- h) existing and projected future population profile of the area surrounding the site;*
- i) description and safety assessment of the site on which a facility is to be located. The assessment must contain an analysis and evaluation of the major structures, systems, and components of the*

facility that bear significantly on the acceptability of the site under the radiological consequence evaluation factors;

- j) information demonstrating that site characteristics are such that adequate security plans and measures can be developed;*
 - k) The quality assurance/ quality control programme for the nuclear installation;*
 - l) complete environmental impact assessment report, environmental management system and land use pattern duly approved by the competent regulatory body or bodies;*
 - m) detailed description of the physical characteristics of the proposed site that could pose a significant barrier to the development of emergency preparedness and response plans.*
- (2). The SAR shall also include:*
- a) emergency preparedness and response plans stating its proposed major features for review and approval by the Authority in consultation with the Nuclear Security Committee (NSC) and the Nuclear Emergency Committee (NEC);*
 - b) emergency preparedness and response plans submitted under paragraph 2 (a) above shall include the proposed inspections, tests, and analyses that the applicant shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility when constructed shall be operated in conformity with the emergency preparedness and response plans, the provisions of the Act, and the Authority's regulations;*
 - c) description of contacts and arrangements made with Federal, State, and Local governmental agencies with emergency planning responsibilities;*
 - d) any certifications that have been obtained;*
 - e) where these certifications cannot be obtained, the Site SAR must contain information, including a utility plan, sufficient to show that the proposed plans provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the site, and*
 - f) under the option set forth in paragraph 4 of this section, the applicant shall submit a written commitment to the Authority from the governmental agencies that:*
 - g) the proposed emergency preparedness and response plans are practicable;*
 - h) these agencies are committed to participating in any further development of the plans, including any required field drills, and*
 - i) that these agencies are committed to executing their responsibilities under the plans in the event of an emergency."*

The NNRA has also developed a draft Guidance on the Licensing Process for nuclear power plants in Nigeria. The guidance document which development involved consideration of relevant IAEA reference materials with additional inputs from national stakeholder institutions has the objective of providing:

- i) guidance on the licensing process to be applied by the NNRA for granting licences for nuclear power plants and their activities, including some aspects of regulatory control;*
- ii) information on the topics and documents that should be considered in the licensing process throughout the lifetime of the nuclear power plant.*

3.4.1 Regulating Nuclear Power Plant Siting in Nigeria

In 2007, the Nigeria Atomic Energy Commission (NAEC) constituted an Inter-Ministerial Committee for the Selection of Candidate Sites for the possible

installation of Nuclear Power Plants (NPPs). The Committee screened and ranked 7 Possible Candidate Sites before announcing 4 possible NPP sites. By the powers conferred on it by Sections 6 and 47 of the Act and in anticipation of the possible authorization of these NPP Sites, the NNRA in 2007 also set up a **Technical Advisory Committee to Draft Regulation/Guidance for the Licensing of Sites for NPPs**. This led to the close collaboration between the NNRA, IAEA and other relevant national stakeholder institutions to the completion of the **Draft Regulations for the Licensing of Sites for Nuclear Power Plants**. The main objective of these Regulations is to establish the requirements for the elements of site evaluation for a NPP so as to characterize fully the site specific conditions pertinent to the safety of an NPP to protect the public and the environment from the possible radiological consequences of nuclear incidents or accidents.

To further ensure compliance with international legal requirements, the Draft Regulations was put before an international panel of experts drawn from the IAEA, Regulatory Bodies from South Africa, Germany and Russia, as well as IAEA consultants from Spain and Italy at the **National Workshop on the Safety Requirements for Nuclear Power Plant Siting; 26th - 30th October 2009** organized by NNRA and IAEA in Abuja. The workshop, which was under the aegis of a Technical Cooperation Project between Nigeria and the IAEA - **Development of National Capabilities for Regulating of a Nuclear Power Plant - IAEA NIR/9/010** was to **Appraise Current Progress of National Efforts and Determine Future Progression of Site Licensing Efforts, Deliberate on All Safety Requirements for the Siting of NPP and Review the Draft Regulation/Guidance for Licensing Site for Nuclear Power Plants (NPP) In Nigeria** using specific references to past experiences.

At the end of the IAEA Mission, it recommended amongst others that **... on what would be the acceptance criteria for approval of the Site Evaluation Report to be presented by the Applicant, the Regulations should be revised to use IAEA Safety Requirements for Site Evaluation for defining in a logical and structured form the general and specific requirements.**

The above IAEA recommendations amongst others were integrated into the draft regulations at a national stakeholders workshop held in Abuja July 2010. The final draft regulations emplace a number of safety requirements for Operators of nuclear power plants, including periodic safety reviews. It further allows for only

fixed term site licence lasting for 10 years at a time. It should be noted, however that in Nigeria, different institutions are by law saddled with the responsibility of issuing different permits for the different aspects of the plant e.g. environment, land use etc. In this regard, the NNRA shall work closely with these institutions in achieving its mandate. The draft regulation is scheduled for gazetting by the fourth quarter of 2016.

Additionally, the following Regulations and Guidance Documents are in various stages of preparation:

- i Draft Nigerian Regulations for Design and Construction of Nuclear Facilities
- ii Draft Nigerian Regulations for Commissioning of Nuclear Power Plants
- iii Draft Nigerian Regulations on Licensing and Qualification of Nuclear Power Reactor Operators
- iv Draft Nigerian Regulations for the Operation of Nuclear Power Plants
- v Draft Nigerian Regulations for the Decommissioning of Nuclear Power Plants
- vi Draft Nigerian Regulations on Emergency Preparedness;
- vii Draft Nigerian Regulations on Establishment of Integrated Management Systems for Facilities and Activities
- viii Draft Nigerian Regulations on Financial Protection and Civil Liabilities for Nuclear Facilities
- ix Draft Guideline for Radiological Environmental Impact Assessment.

Due cognizance of the Fukushima Daiichi accident and mandate of the Vienna Declaration are being taken in the development of these draft regulations. Importantly, the experience gained from the accident strongly guides the drafting process to ensure adequate provisions are made to guard against such accident.

3.5 Regulatory Inspections

Though Nigeria currently has no nuclear power plants on its territory, the NNRA applies the required safety standards to the NIRR-1 (although it is outside the purview of the CNS) pursuant to **Article 6**.

The Act provides in Section 37 (1) thus:

“The Authority shall appoint Inspectors to inspect practices and installation licensed or proposed to be licensed by the Authority.

(2) An Inspector may for the purposes of the execution of this Act

(a) enter, without hindrance, at any time during the normal working hours of the establishment concerned or as may be determined by the Authority, upon any premises, vehicle, ship or aircraft to which this section applies, with such equipment as he requires for the performance of his duty as specified under this Act;

(b) inspect any plans, drawing, record, register or documents pertaining to-

(i) the design, siting, construction, testing, development, operation, decommissioning or abandonment of an installation.

(ii) the health and safety, security or environmental aspect of any activity covered by this Act.

(iii) any matter relevant to the enforcement of this Act;

(c) carry out tests and take samples, measurements and photographs of the installation on written approval by the Authority;

(d) ask the operator of any vehicle, ship or aircraft or any person who has duties on or in connection with any premises, vehicle, ship or aircraft, to provide him with such information relating to the vehicle, ship or aircraft as he may require”.

Additionally, under the NSSS Bill, the power to carry out inspection was retained thus:

“39. (1) The Authority shall pursuant to section 9 of this Act appoint inspectors to inspect licensed or proposed nuclear or radiological installations, practices, nuclear materials and ionizing radiation sources; and facilities of radiation safety service providers in the country;

(2) An inspector appointed in furtherance of the provisions of subsection (1) shall have the powers to:

a) enter, without hindrance, at any time during the normal working hours of the establishment concerned or as may be determined by the Authority, any premises, vehicle, ship or aircraft to which this section applies, with such equipment as he requires for the performance of his duty as specified under this Act;

b) inspect any plans, drawings, records, registers or documents pertaining to:

(i) the siting, design, construction, testing, development, commissioning, operation, decommissioning or abandonment of an installation,

(ii) the health, safety, security or environmental aspects of any activity covered by this Act,

(iii) any matter relevant to the enforcement of this Act;

c) carry out tests and take samples, measurements and photographs of any installation;

d) direct the owner or operator of any vehicle, ship or aircraft to provide him with such information relating to the vehicle, ship or aircraft as he may require;

e) direct operators of nuclear power installations, research reactors and other facilities to carry out emergency drills and stop unsafe operation and practices.

40. No person shall:

a) knowingly make a false or misleading statement to an inspector; or

- b) *deliberately obstruct or hinder or attempt to obstruct or hinder an inspector from carrying out his functions under this Act.*

41. *The inspector shall submit a report of the inspection or investigation to the Authority for necessary or appropriate action”.*

The NNRA periodic inspection programme for the NIRR-1 which was developed in 2006. It includes announced and unannounced inspections. The NNRA would also develop an inspection programme for nuclear power plants to cover the following objectives:

- i to assess the safety level at the plants as well as the safety management;
- ii to identify possible problems at the plants and in procedures of the operating organizations;
- iii to identify areas of emphasis on improved management of the entire inspection programme, including the timely conduct and accurate reporting of results.

3.6 Responsibility of the licence holder

Articles 9 and 10 require ***“Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility”***, and

“Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety”.

The provisions of **Articles 9** and **10** have been fully domesticated into the **NSSS Bill** which clearly placed responsibility for the safety of nuclear power plants on licence holders. Also, the development and emplacement by the licensee of an advanced safety culture is required to be maintained when designing, constructing and operating nuclear power plants are enshrined in the Bill.

Specifically, Section 37 requires: *“Any person authorized by the Authority for any nuclear installation, radioactive waste management facility, practices or ionizing radiation sources shall have the prime responsibility for the safety and security of the installation, facility, practice or source.”*

3.7 Emergency Preparedness

Article 16 requires that ***“Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency. For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body”***.

“Each Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent

authorities of the States in the vicinity of the nuclear installation are provided with appropriate information for emergency planning and response”.

“Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency”.

The **NSSS Bill** requires licence holders to develop on-site emergency programmes and shall also be responsible for its implementation. However, though Nigeria does not yet have a nuclear power plant as earlier indicated, the NNRA pursuant to the Act is empowered to: **“establish in cooperation with other competent national authorities, plans and procedures which shall be periodically tested and assessed for coping with any radiation emergency and abnormal occurrence involving nuclear materials and radiation sources”.**

In the above regard and in conjunction with the IAEA, NEMA and other relevant stakeholder institutions in the country, the National Nuclear and Radiological Emergency Response Plan (NNRERP) was developed. NEMA is by law in Nigeria responsible for the coordination of national emergency response and the response plan is currently being included in the National Emergency Plan. The NNRERP clearly identifies relevant stakeholder institutions and their roles in case of a nuclear emergency and the procedures would be regularly tested in annual emergency exercises to be organized by these institutions. The NNRA is to serve as the Lead Technical Agency.

Nigeria organized and/or participated in the following programmes aimed at building capacity to tackle radiological emergencies:

- i. National Training Course for First Responders to Radiological Emergencies held in December 2011
- ii. Training on Response and Assistance Network Workshop held at Fukushima, Japan from 28th – 31st May 2013
- iii. IAEA Training Course on Research Reactor Emergency Response held at Rabat from 24th – 28th June 2013
- iv. Workshop on Reporting and Requesting Assistance scheduled for 12th – 24th November 2013 in Vienna, Austria.

3.7.1 Highlights of Emergency Preparedness Review (EPREV) Mission

As part of Nigeria’s efforts in building a robust emergency infrastructure, she invited an Emergency Preparedness Review (EPREV) Mission by the IAEA. In this

regard, a preparatory meeting for the EPREV was conducted from 5 to 6 August 2014 and the Mission was conducted from 15 to 23 June 2015. The key objectives of the Mission were to enhance nuclear and radiation safety and emergency preparedness and response by:

- i Providing Nigeria with an opportunity for self-assessment of its activities against IAEA safety standards on EPR;
- ii Providing Nigeria with a review of its EPR arrangements;
- iii Providing Nigeria with an objective evaluation of its EPR arrangements with respect to IAEA safety standards and guidelines;
- iv Contributing to the harmonization of EPR approaches among IAEA Member States;
- v Promoting the sharing of experience and exchange of lessons learned;
- vi Providing reviewers from IAEA Member States and the IAEA staff with opportunities to broaden their experience and knowledge of EPR;
- vii Providing key Nigerian counterparts with an opportunity to discuss their practices with reviewers who have experience with different facilities and activities in the same field;
- viii Providing Nigeria with recommendations and suggestions for improvement; and
- ix Providing other States with information regarding good practices identified in the course of the review.

The Mission noted that nuclear and radiological EPR framework in the Federal Republic of Nigeria is being effectively built on an existing national emergency management system that is clear, well defined and tested. Its all-hazards approach is consistent with IAEA safety standards and is a key to the future success of the nuclear and radiological EPR programme. Also, the EPREV team noted the excellent cooperation of all organizations involved in the review mission. In particular, the team commended the openness and transparency of all parties met during the mission. In addition, the Mission identified strengths in the following areas:

- i Specific arrangements for responding to nuclear and radiological emergencies are well integrated into the country's all-hazards emergency management system;
- ii The roles of the NNRA and the NEMA are recognized and appreciated by relevant response organizations.

Additionally, the Mission identified some areas in which improvements should be considered, or where progress in implementation should be sustained. These include the following key elements:

- i Capabilities to respond to a nuclear emergency should be strengthened in line with the progress being made in embarking on a nuclear power programme;
- ii State and local government levels need to be better involved in EPR;
- iii The roles of all response organizations and arrangements for appropriate coordination need to be clarified;
- iv The capabilities of first responders with regard to training, competence and the procurement and maintenance of equipment need improvement;

- v Arrangements for providing instructions and keeping the public informed during emergencies need to be enhanced;
- vi Arrangements for a medical response to nuclear or radiological emergencies require improvement.

To effectively meet the recommendations and suggestions of the Mission, the Federal Republic of Nigeria has developed an action plan to implement the recommendations and suggestions and plans to invite the IAEA for an EPREV follow-up mission within two to four years to review its implementation.

4.0 INTERNATIONAL COOPERATION

Conscious of the need to partner with national and international institutions to amongst others build requisite capacity and exchange experience on nuclear safety and other related matters, and in line with Section 4 (f) of the Act, Nigeria is member of the Regulatory Cooperation Forum (RCF) as well as the Forum of Nuclear Regulatory Bodies in Africa (FNRBA).

Also, Nigeria is in cooperation with the European Commission under the INSC Project MC.03/10 titled "Training and Tutoring for Experts of Nuclear Regulatory Authorities and their TSOs for Developing or Strengthening their Regulatory and Technical Capabilities" for building requisite regulatory capacity.

Additionally, the NNRA is in discussions on cooperation with other nuclear regulatory bodies. In this regard, it is concluding Memoranda of Understanding (MOU) with:

- i Federal Environmental, Industrial and Nuclear Supervision Service of the Russian Federation; and
- ii National Nuclear Regulator of South Africa.

The MOU are aimed at manpower development of NNRA personnel; strengthening of legislative capacity of NNRA and exchange of experience in safety regulation and regulatory supervision.