
INTERNATIONAL COOPERATION FOR NUCLEAR SAFETY AND SECURITY - THE NIGERIAN EXPERIENCE

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Objectives

- The objective of this presentation is to highlight the role of international cooperation, both multilateral and bilateral, in developing and strengthening the nuclear security system in Nigeria
- It will further highlight how these have contributed to enhancing security of radioactive sources under regulatory control and the response to those outside of regulatory control

Introduction

- The Nigerian Nuclear Regulatory Authority (NNRA) was established by the Nuclear Safety and the Radiation Protection Act 19 of 1995 (the Act). Subject to this Act, **the Authority shall be charged with the responsibility for nuclear safety and radiological protection regulation in Nigeria and,shall**
- regulate the possession and application of radioactive substances and devices emitting ionizing radiation;

Introduction

- ensure protection of life, health, property and the environment from the harmful effects of ionizing radiation, while allowing beneficial practices involving exposure to ionizing radiation;
- advise the Federal Government on nuclear security, safety and radiation protection matters; and
- liaise with and foster co-operation with international and other organizations or bodies concerned having similar objectives

IAEA Nuclear Security activities in Nigeria

- Nigeria became an IAEA Member States in 1964 and has signed and ratified several treaties and conventions. These include:
 - - Convention on Nuclear Safety
 - - Convention on Physical Protection of Nuclear Material
 - - Protocol Additional to the Agreement between Nigeria and the IAEA on the applications of safeguards

IAEA Nuclear Security activities in Nigeria

- - Amendment to the Convention on the Physical Protection of Nuclear Material
- - Comprehensive Safeguards Agreement
- - Convention on Early notification of a Nuclear Accident
- - Convention on Assistance in the case of a Nuclear Accident or Radiological Emergencies
- - Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

1. International Nuclear Security Advisory Service (INSServ) Mission

- At the invitation of the Federal Government of Nigeria, the INSServ Mission visited Nigeria from 3rd - 7th May 2004. The objectives were:
 - - To determine the needs and concerns of State authorities in the area of nuclear security and specifically to ensure the physical protection of nuclear and other radioactive material
 - - To review the existing legal framework in support of nuclear security

1. International Nuclear Security Advisory Service (INSServ) Mission

- - To review the national infrastructure for the detection of and response to illicit trafficking in nuclear and other radioactive materials
- - To determine the need for assistance and support in nuclear security, and
- - To develop a work plan for providing the required assistance

Methods Utilized

- The INSServ team familiarized itself with the system of oversight and the supporting legal structure for the security of nuclear and other radioactive materials and combating illicit trafficking in Nigeria.

This was accomplished through:

- Meetings and discussions with officials of many government organizations in Nigeria
- Visits to the Centre for Energy Research and Training (CERT), Zaria and the National Hospital, Abuja
- Visits to the Seme border crossing point, the Lagos International Airport and Apapa seaport to view the facilities and procedures

Nuclear Security Needs

The following areas were reviewed:

- Legal and Legislative Issues
- Control and Securing of Radioactive Sources
- Illicit Trafficking and Border Controls
- National Response Plan

Key Conclusions

- Nigeria was commended for the provision of the necessary resources to the Nigerian Nuclear Regulatory Authority (NNRA),
- The INSServ team was pleased to note the establishment of the Inter-ministerial Committee on Nuclear Security, which was performing a vital role in the coordination of activities related to nuclear security in Nigeria.

Legal and legislative issues

- Nigeria should consider review of the Nuclear Safety and Radiation Protection Act 1995 to ensure that it adequately covers nuclear security.
- Nigeria should review its NiBIRR regulations to determine whether security issues can be more effectively managed. To this end, the IAEA's interim guidance on the physical protection of radioactive sources, the categorisation of radioactive sources and the Code of Conduct on the Safety and Security of Radioactive Sources were recommended to provide useful guidance.
- Consideration should be given by Nigeria to adherence to the Convention on Physical Protection of Nuclear Material
- Action should be taken to complete ratification procedures to bring into force the Additional Protocol to Nigeria's Safeguards Agreement with the IAEA

Control and Securing of Radioactive Sources

- Nigeria, with the assistance of the IAEA, should take steps to secure and store disused radioactive sources and to locate any sources not under control in Nigeria
- A Design Basis Threat (DBT) workshop should be held with the assistance of the IAEA to assist Nigeria in assessing the threat to the research reactor and radioactive material within the country.

Illicit Trafficking And Border Controls

- Consideration should be given to the provision of monitoring equipment at a limited number of major seaports, international airports, and land border crossing points in view of the large flow of goods and people through these locations.
- In addition, specific training should be given to the front-line border guards, customs officers, and police officers and related services.

National Response Plan

- Nigeria government organizations should develop a National Response Plan to deal with incidents involving radioactive materials. IAEA could provide expert assistance in this effort.
- A system should be established to respond to the seizure of suspected radioactive material to characterize the material in the field and to provide detailed laboratory analysis of such material

1. International Nuclear Security Advisory Service (INSServ) Mission

- The recommendations and conclusion of this Mission led to other Missions to Nigeria in order to proffer solutions to the identified needs or implement the recommendations

2. Nuclear Security Upgrade Mission for Border posts

- This Mission was in Nigeria from 23rd - 24th November 2005
- The Mission evaluated some of our ports for the possible installation of a Portal Radiation Monitor. These included Apapa Seaport, Tin Can Island Seaport and Murtala Muhammed International Airport, Lagos, Nigeria

3. IAEA Verified Inventory and Orphan Source Mission

- An IAEA Verified Inventory and Orphan Source Mission was conducted in August 2007 at the invitation of Federal Government of Nigeria.
- Some of the objectives of the mission were as follows:
 - - Review the existing sealed source inventory
 - - Discuss any knowledge of possible orphan sources in the country
 - - Review the radiation detection equipment available to NNRA Inspectors to determine if additional equipment or tools are needed implement a verified inventory
 - - Evaluate the security at Waste Management Facility in Nigeria and consider physical protection upgrades
 - - Evaluate the physical security of IAEA Category I sources in the country and consider security upgrade of the facilities

3. IAEA Verified Inventory and Orphan Source Mission

- The Mission concluded that:
- - A systematic process of verifying the inventory data once it is entered into RAIS is needed to validate the inventory and to accurately determine the status of each source in the country. The status - either active use or disused or orphan - for each source should be determined
- - A public information campaign to assist with locating sources of radiation within the country should be considered
- - Disused sources should be collected and placed into safe and secure storage at the national radioactive waste storage site,
- - There is the need to verify the inventory of the legacy sources at Ajaokuta Steel company, and
- - Additional Radiation detection equipment should be made available to NNRA staff.

4. Collection and Repatriation of Legacy sources

- The NNRA with the assistance of the IAEA embarked on the collection and repatriation of High-Risk Legacy Sources from the country in July 2007. The radioactive sources involved were:
 - two disused Cobalt-60 Teletherapy Sources for Cancer treatment at Lagos University Teaching Hospital (LUTH), Lagos, Nigeria including:
 - a Canadian made Cobalt-60 Head for the Theratron 780 Teletherapy machine, and
 - a Soviet made Cobalt-60 Head for the AGAT RI Teletherapy machine
 - the uncharacterized Caesium-137 Brachytherapy Sources at TGH, Ibadan, and
 - the Cobalt-60 and Caesium-137 Gamma Sources for Biological Control of Tsetse Fly at National Veterinary Centre, Vom, Nigeria which were involved in a fire accident in 2002

US-DOE Global Threat Reduction Initiative (GTRI) Program in Nigeria

- Nigeria through the NNRA is cooperating with the US DOE GTRI Program for the following objectives:
 - Reduce and Protect vulnerable nuclear and other radioactive material located at civilian sites
 - Remove and dispose of excess nuclear and radiological materials
 - Secure and Protect at-risk nuclear and radiological materials from theft or sabotage

US-DOE Global Threat Reduction Initiative (GTRI) Programme in Nigeria

- The NNRA and the US DOE signed the “Basic Ordering Agreement” Contract on 11th March 2005.
- This was followed by an assessment Mission on 19th - 25th April 2008 under the Nigeria - US-DOE Nuclear Security Cooperation Program

US-DOE Global Threat Reduction Initiative (GTRI) Programme in Nigeria

- The Mission visited:
- Old Steel factory (Ajaokuta) to assess source removal options for Legacy Radioactive Sources
- Gamma Irradiation Facility, Radiotherapy Units at EKO Hospital, Lagos and University College Hospital, Ibadan, for possible physical security upgrades
- Research Reactor at CERT, Zaria for possible physical security upgrades, and
- Radioactive Waste Management Facility at CERT, Zaria for possible physical security upgrades and expansion

Joint IAEA/US DOE Nuclear Security activities in Nigeria

- 1. Technical Expert Mission to Ajaokuta Steel Company 21st – 26th July 2008
- Team of Experts from the International Atomic Energy Agency (IAEA), Open Joint Stock Company (OJSC), Russia, US DOE, the Nigerian National Nuclear Security Committee (NSC) and the NNRA undertook a Mission to Ajaokuta Steel Company Limited (ASCL) from 21st - 26th July 2008.

1. Technical Expert Mission to Ajaokuta Steel Company 21st – 26th July 2008

- The objective of the mission was to characterize and establish a complete inventory for the over 200 Legacy radioactive sources at Ajaokuta Steel Company Limited (ASCL).

Nuclear Security achievements through International Cooperation 1

- The Nuclear Safety and Radiation Protection Act has been reviewed to include nuclear security provisions
- Based on the Code of Conduct on safety and security of radioactive sources, and the Supplementary Guidance on the Import and Export of Radioactive sources, the Nigerian Safety and Security of Radioactive source Regulations have been passed to law in 2006

Nuclear Security achievements through International Cooperation 2

- In April 2007, Nigeria became party to the Convention on Physical Protection of Nuclear Material and its Amendment.
- Similarly, the Protocol Additional to the Safeguards Agreement has been ratified and it is in force since April 2007
- The IAEA is providing a Radiation Portal Monitor located at Murtala Muhammed International Airport, Lagos, Nigeria. This is at the installation and commissioning stage. Also import and export of radioactive sources have been restricted to only Ports where radiation detection capabilities exist

Nuclear Security achievements through International Cooperation 3

- A national strategy for locating and for the management of legacy and orphan sources has been developed. As part of this plan, a MOU exists between the NNRA and the Operator of the Radioactive Waste Management Facility (CERT Zaria) on the temporary storage of such sources when they are located and collected

Nuclear Security achievements through International Cooperation 4

- The physical security of the Research Reactor, Radioactive Waste Management Facility (RWMF) and Category I sources in Nigeria have been evaluated with the assistance of the IAEA and the US DOE GTRI Program
- The physical security upgrades of two facilities containing Cat. 1 sources have been completed by the US DOE.
- The IAEA is assisting with the physical security upgrade of the RWMF and the GIF with the Homeland Security Surveillance System (HS3)

Nuclear Security achievements through International Cooperation 5

- Nigeria in March 2007 commenced the training of front-line Officers – Customs, Immigration, Intelligence, Civil Defence and Police Officers with the assistance of the IAEA. This has been sustained through national efforts.
- Through the concept of FLO – MEST, the IAEA has provided some hand held radiation detection equipment. The equipment were reportedly funded by the European Union

Nuclear Security achievements through International Cooperation 6

- With the assistance of the US-DOE GTRI Program, Officers of law enforcement agencies, National Emergency Management Agency, relevant research Institutes and the regulators have been trained on searching for and securing orphan sources
- The US-DOE GTRI Program has further donated relevant equipment needed for the search and secure program for orphan sources

Nuclear Security achievements through International Cooperation 7

- Some high-risk legacy sources have been collected and stored temporarily at RWMF
- Using the multi-lateral approach that the IAEA presents, a Canadian made Cobalt-60 source for the Theratron 780 Teletherapy machine has been repatriated to the country of origin even when the “return-back” clause was not required when the sources were supplied.

Nuclear Security achievements through International Cooperation 8

- The IAEA and the US-DOE GTRI Program in November 2008 supported the National training Workshop on Security of Radioactive Sources in Land and Marine Transportation by providing Resource Persons
- An inventory now exist for the legacy sources at ASCL which are all of Russian origin. The total number of inventoried sources was 234 comprising of 205 Cs-137, 24 Co-60, and 5 Pu-Be mostly of varied activity and manufacturing dates.

Nuclear Security achievements through International Cooperation 9

- A program for the expansion of the RWMF at CERT, Zaria is currently being pioneered and supported by the US DOE GTRI Program
- A National Response Plan to deal with incidents involving radioactive materials including respond to the seizure of suspected radioactive material has been developed and training held for all Stakeholders

Future Cooperation areas

- Repatriation of legacy sources of Russian origin
- Provision of Radiation Portal Monitors at other designated entry points
- Conversion of the Nigerian Research Reactor fuel from HEU to LEU

Summary

- Development of legal and regulatory framework for nuclear security
- Securing high-risk radioactive sources including those that are out of regulatory control
- Enhance border security and preventing illicit trafficking of radioactive material
- Improve human capability in nuclear security

Conclusion

- The multilateral and bilateral approaches adopted by the NNRA has gone a long way in building and strengthening nuclear security system in Nigeria.