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Regulatory Challenges for the Security of Radioactive Materials and Associated Facilities

Prof. B. J. B. Nyarko
Director General
Ghana Atomic Energy Commission
P.O BOX LG80
LEGON-ACCRA, GHANA
EMAIL: b.nyarko@gaecgh.org

OUTLINE OF PRESENTATION

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- Regulatory Infrastructure
- Nuclear Security Infrastructure
- Regulatory Challenges
- Plans to address the challenges
- Conclusion

Background

- Use of radioactive materials started in 1952 in the then University College of Gold Coast (now the *University of Ghana*). Radioactive materials are now being used in;
- Medicine
  - Radiotherapy and Nuclear medicine
- Industry
  - industrial radiography and nuclear gauging in the mining, road construction, exploration, manufacturing, and petrochemical industries.
  - Sterilization of medical products and irradiation of foodstuff
- Research and Teaching
  - At the GAEC, Cocoa Research Institute of Ghana (CRIG), the Universities and other Institutions

Establishment of GAEC

- GAEC was established by an act of parliament – Act 204, in 1963.
- Act 204 has been superseded by act 588 of 2000.
- The main functions of GAEC:
  - Promotion, development and utilization of the peaceful application of nuclear technologies.
  - Advise Government on Atomic Energy Matters

GAEC STRUCTURE

- GAEC has 6 Institutes, namely:
  - Radiation Protection Board/Radiation Protection Institute(RPB/RPI)
  - National Nuclear Research Institute (NNRI)
  - Radiological and Medical Science Research Institute (RAMSRI)
  - Biotechnology and Nuclear Agriculture Research Institute (BNARI)
  - Ghana Space Science and Technology Institute (GSSTI)
  - Graduate School of Nuclear and Allied Sciences (SNAS)

Facilities at GAEC

- Major Facilities include:
  - Secondary Standards Dosimetry Laboratory
  - A 30 kW research reactor facility
  - Gamma irradiation facility
  - Waste management facilities

Gamma Irradiation Facility

National Radioactive Waste Management facility

Secondary Standards Dosimetry Laboratory

Regulatory Infrastructure (1/5)

- The regulatory system of Ghana is based on relevant legislation (Act 588).
- The Radiation Protection Board (RPB) established in 1993 as National Regulatory Authority by PNDC Law 308, 1993 with the Radiation Protection Institute (RPI) as executive arm of the RPB.
- Under this legislation and organizational structure of the GAEC, there is an inherent conflict of interest between regulatory functions of the RPB/RPI and promotional role of the GAEC.
- Additionally, a conflict of interest existed between the RPB as the regulator and RPI as provider of services to users including licensees.
- Therefore the RPB/RPI could not be considered as an effectively independent regulatory body.

Regulatory Infrastructure (2/5)

- The RPB draws its powers and functions from the Radiation Protection Instrument (LI) 1559 of 1993;
  - To develop regulations and guidance documents
  - Issue licenses and authorizations for all activities involving radioactive materials
  - Carry out inspections, monitoring and enforcement activities
  - make recommendations to Government regarding the development and implementing of national policy, strategy, and laws on radiation protection
- Regulatory Authority Information System (RAIS) is being used as a management tool;

(i) to keep a National Inventory of radiation sources as well as radiation emitting devices and wastes generated

(ii) for the authorization, inspection and enforcements activities.

Regulatory Infrastructure (3/5)

- The functions of RPB (RCD) are complemented with three technical Centres namely:
  - Environmental Protection and Waste Management Centre (EPWMC)
  - Health Physics and Instrumentation Centre (HPIC)
  - Nuclear Safety, Security, Safeguards Centre (NSSSC)
- The existing national legal framework for peaceful uses of atomic energy in Ghana covers primarily radiation safety, and even in this field it is found to be incompatible with international standards and requirements.
- Also, the present framework does not address nuclear security.
- Action to revise the enabling legislation integrating radiation safety and nuclear security has been initiated by the Ghanaian authorities and is in progress.

Regulatory Infrastructure (4/5)

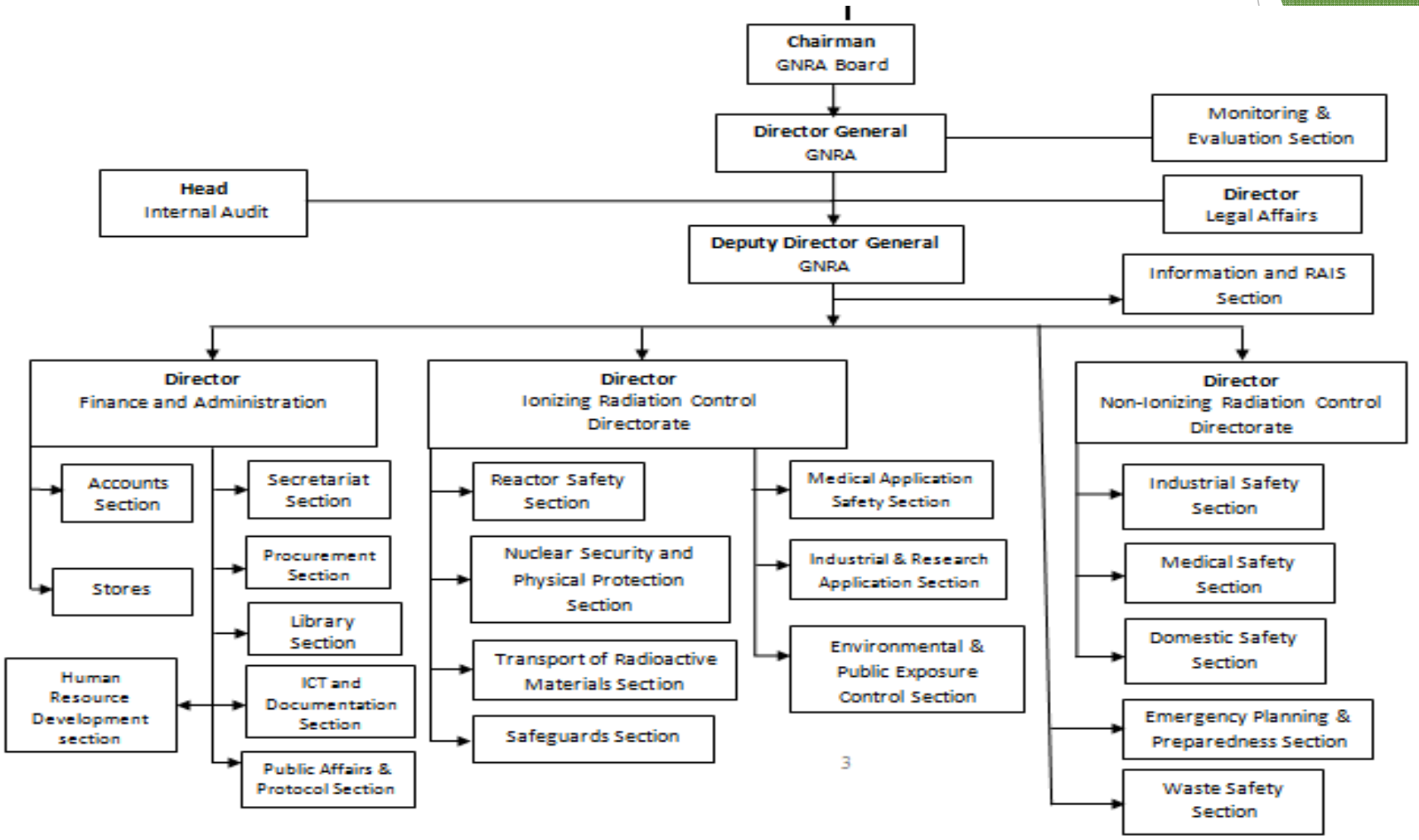
- The RPB collaborates through MOU with the following state agencies to carry out its mandate:
  - Customs Excise and Prevention Services,
  - The National Security Council,
  - Bureau of National Investigations,
  - Ghana Standard Authority and
  - Environmental Protection Agency.
  - ETC

- Representatives of these organizations are trained in radiation detection and protection procedures.

Regulatory Infrastructure (5/5)

- **In June 2015 the new nuclear regulatory authority bill was passed by parliament of Ghana into Law establishing an independent regulatory body known as Ghana Nuclear Regulatory Authority (GNRA).**
- **The GNRA will be completely independent of GAEC and mandated to carry out the regulatory control of the radiation and nuclear materials in Ghana.**
- The functions of GNRA will be:
  - Provision for the adequate protection of the present generation, posterity and the environment against the harmful effects of ionizing and non-ionizing radiation for the safety and security of radiation sources nuclear materials and radioactive waste.
  - It will also ensure that radioactive sources and nuclear materials including radioactive waste from within and outside the country are properly controlled.

GHANA NUCLEAR REGULATORY AUTHORITY (GNRA)



Nuclear Security Infrastructure

- The institutional framework for ensuring nuclear security in Ghana is relatively well developed albeit with some challenges.
- A body with responsibilities for security matters at the State level is called the National Security Council (NSC or the Council).
- The Council was established under the Security and intelligence Act of 1996 (Act 526) but there are no specific provisions relating to nuclear security.
- To streamline coordination and cooperation in nuclear security matters at the national level, the Radiation Protection Institute (RPI) established the Project National Committee (PNC) as a consultative body with the Chairperson of the PNC as the National Security Coordinator.
- Ghana is also party to eight (out of twelve) legally binding international instruments relevant to nuclear security.

- Other activities and facilities in Ghana in Nuclear Security matters:

Nuclear Security Infrastructure

- Upgraded security infrastructure at the various nuclear facilities such as the Radiotherapy Centres (KBTH and KATH), Waste management, GHARR-1 to counter any malicious intent.
- Nuclear Security Trainings are provided to frontline officers of national security agencies such as BNI, CEPS, etc.
- SNAS was designated as AFRA Regional Designated Center (RDC) for Education and Training in Radiation Protection in 2011.

Nuclear Security Infrastructure

- Establishment of Nuclear security support centre (NSSC), an IAEA Regional Center for training in nuclear security since 2009.

NSSC aims:

- At supporting and facilitating the development of sustainable human resources through the provision of a National Nuclear Security Training Programmes and,
- At providing Technical Support Services for lifecycle equipment management and Scientific Support Services for the detection and response to nuclear security events.

NSSC

Physical Protection Features at the National Radioactive Waste Management facility

Regulatory Challenges (1/3)

- The Act and regulations duly empower the RPB/RPI to discharge its regulatory functions. However, it is not clear whether this empowerment includes nuclear security aspects of the regulated facilities.
- The present staffing level of the RPB/RPI is barely adequate, but it is less than optimal to meet increasing development needs.
- Lack of infrastructure in the management of radioactive waste materials especially disused sealed sources.

Regulatory Challenges (2/3)

- The National Radioactive Waste Management Policy and Strategy are not fully established (draft).
- The National Radioactive Waste Management regulations which include regulations on radioactive waste disposal are not in place (drafting stage).
- Financial challenges in the safe and secure management of radioactive materials.
- Difficulty in controlling movement of radioactive materials through unauthorized entry points into the country.
- Lack of secure storage facility at user premises for radioactive materials

Regulatory Challenges (3/3)

- High cost associated with repatriation and return of disused sealed sources to country of origin and supplier/manufacturer.
- Lack of public awareness on the safety and security of radiation and nuclear issues in the country.
- Lack of expertise and manpower in implementation of nuclear security education and training programmes.
- No policy on the nuclear knowledge management in Ghana
- The RPB/RPI has no formal procedures to ensure the security and protection of sensitive information including information received in confidence from another party, to prevent its misuse.

Plans to address the challenges (1/2)

To improve the safety and security regime on radiation and nuclear issues in Ghana, the following are being put in place:

- Establishment of a GNRA for effective regulatory control.
- Adoption of the Draft Radioactive Waste Regulations and Radioactive Waste Management Policy and Strategy
- Enforcement of the return of disused sealed sources to the original supplier or manufacturer.
- Establishment of the radioactive waste management fund for safe management radioactive materials in Ghana.
- Training and retraining of frontline personnel of CEPS, National Security and other state security agencies.

Plans to address the challenges (2/2)

- Enforcement on the establishment of storage facility at user premises for radiation sources and radioactive materials
- To ensure sustainability of the training programmes, Ghana through IAEA TC Project RAF/9/048 is developing a National Strategy for education and training in radiation , transport and waste safety.
- The SNAS was designated as Regional Training Centre to provide education and training in Radiation Protection (i.e. NSTP and PGEC).
- Physical protection infrastructure at some key facilities to ensure adequate security of radiation and nuclear materials mainly with support from DOE of USA and IAEA.

CONCLUSIONS

- GHANA is committed to developing its infrastructure to enhance an effective workforce delivery that will ensure the safe and secure use of radiation sources and nuclear materials.
- Establish an enhanced network of competent nuclear facility based personnel through training.
- Ensure a sustainable system of nuclear knowledge management

THANKS FOR YOUR ATTENTION