



NUCLEAR REGULATORY AUTHORITY, GHANA

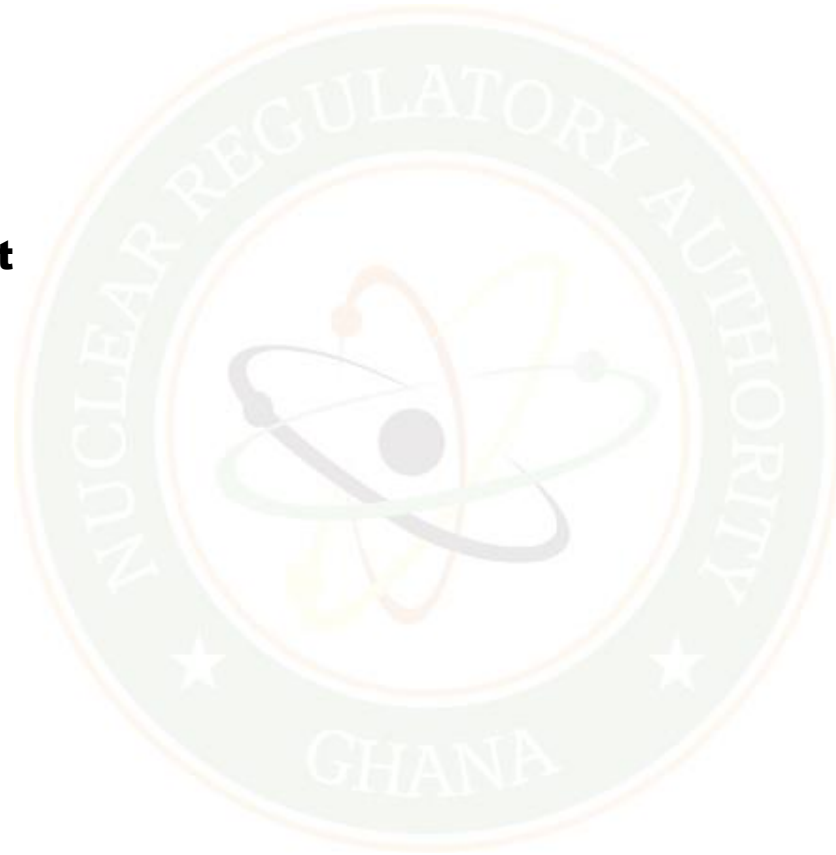
Regulatory Infrastructure for Nuclear Power Programme in Ghana

Dr. R. G. Abrefah
Nuclear Regulatory Authority

"Ensuring the protection of people and the environment from radiation hazards."

ORDER OF PRESENTATION

- **Summary of Nuclear Power Programme**
- **Overview of Nuclear Law**
- **Management System**
- **Human Resource Development**
- **Development of Regulations**
- **Ongoing Collaborations**
- **Trainings Undertaken**
- **Discussions with EC's INSC**
- **RCF Support Areas**
- **Conclusion**



SUMMARY OF NUCLEAR PROGRAMME IN GHANA

- **Ghana has enacted the Nuclear Regulatory Authority Act, 2015 (Act 895) allowing for formation of Nuclear Regulatory Authority (NRA)**
- **Ghana has hosted Phase 1 Integrated Nuclear Infrastructure Review (INIR) Mission in January 2017 and currently implementing recommendations from the Mission**
- **Ghana has completed conversion of her Miniature Neutron Source Reactor (MNSR) from High-Enriched Uranium (HEU) to Low-Enriched Uranium (LEU) fuel**
- **Draft regulations to ensure nuclear safety, security and safeguards are being developed**
- **Bi-lateral and international collaboration are being used for manpower training and equipment acquisition to ensure safe introduction of nuclear power**
- **The Road Map for first nuclear power plant is as presented in Figure 1 below:**



Fig. 1: Roadmap for first Nuclear Power Plant in Ghana

OVERVIEW OF NUCLEAR LAW

- **The Nuclear Regulatory Authority Act, 2015 (Act 895) established the Nuclear Regulatory Authority (NRA) as the competent authority for nuclear regulation in Ghana**
- **The Scope of the Law:**
 - **regulations and management of activities and practices for the peaceful use of nuclear energy and radiation;**
 - **management of radioactive waste resulting from civilian applications in Ghana;**
 - **management of spent fuel resulting from the operation of civilian nuclear reactors in Ghana**
- **The Authority is organised as shown in Figure 2 below**

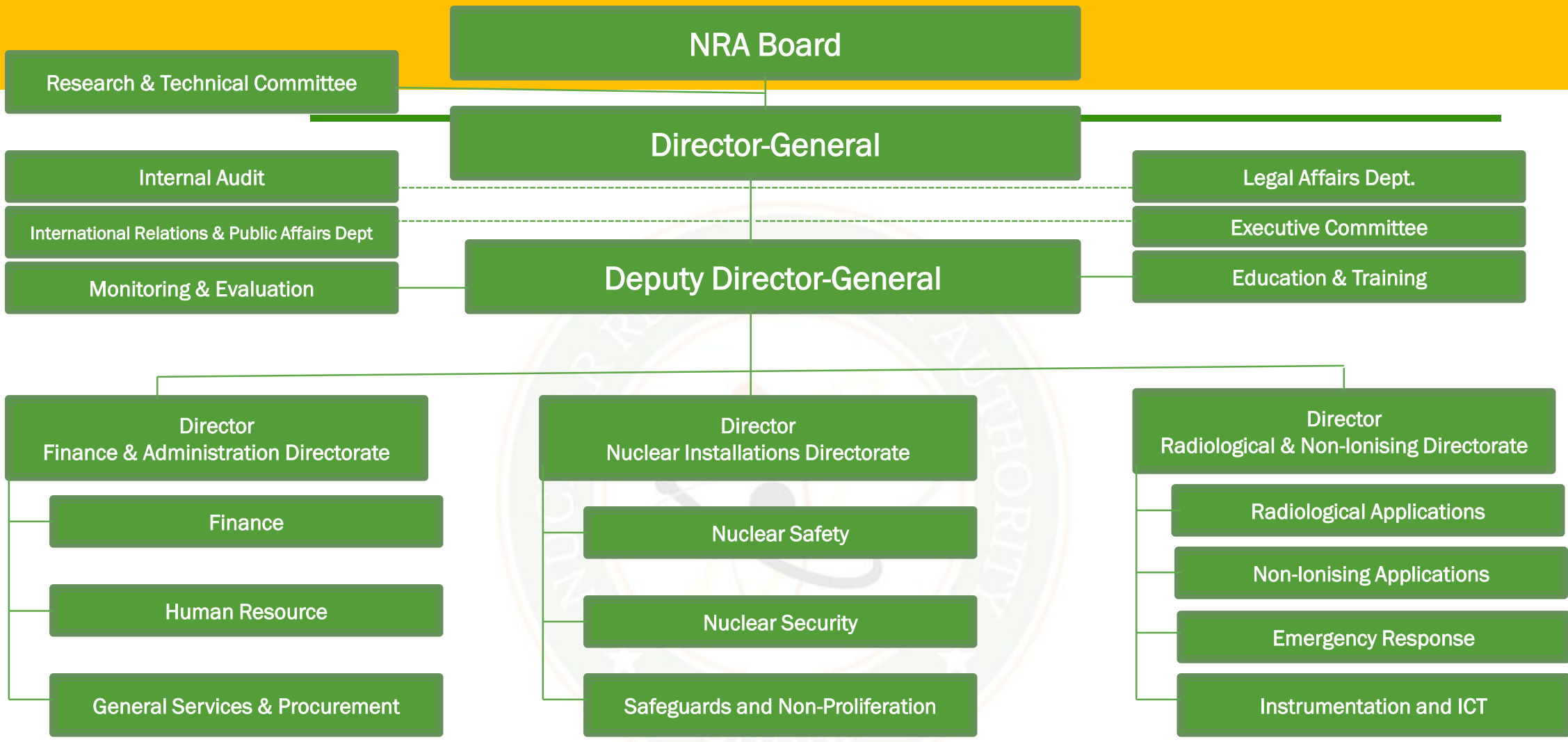


Fig. 2: Organogram of NRA

Functions of NRA (1/2)

- **Facilitates the development of national policies in**
 - **Nuclear safety and research**
 - **Security of nuclear and radioactive materials, associated facilities and activities**
 - **Implementation of international obligations in nuclear field**
- **Issue, modify, suspend or revoke authorisation, and determine conditions for authorisation**

Functions of NRA (2/2)

- **Public awareness creation on nuclear and radiation matters**
- **Establish and maintain a national register of radiation sources and of persons authorised to carry out any activity or practice related to a source of radiation**
- **Collaborate with agencies responsible for emergency, security and environment to establish plans and procedures for coping with radiological, abnormal occurrence, and development of environmental impact assessments**
- **Exchange information and co-operate with regulatory authorities of other countries and relevant international organisations on matters of nuclear safety, nuclear security and safeguards**

MANAGEMENT SYSTEM OF NRA

- **NRA Management System is being patterned after requirements in IAEA Safety Standard GSR-Part 2**
- **A seven (7) member Committee constituted to draft IMS Manual for NRA**
- **NRA Management seeks to ensure that authorised persons operate their facilities at all times in a safe, secured and safeguarded manner**
- **NRA seeks to be open and transparent in its development and implementation of regulations and decisions**
- **The Board of NRA ensures prudent management of resources and implementation of functions conferred by Act 895**

STAFFING AND CAPACITY POLICY

- **In building capacity through staffing (including recruitment and promotion), NRA embraces the flexibility in the Law while respecting the values of merit, non-partisanship, fairness, access, transparency and diversity**
- **NRA ensures that the right persons are in the right roles, in the right numbers and at the right time within the approved establishment levels**
- **In order to ensure a competent and sustainable workforce, the NRA ensures that future needs and vacancies are forecasted and strategies identified to address these needs as part of an integrated planning process**
- **The NRA also develops succession planning and knowledge transfer strategies as well as ensure the effective on-boarding, induction and orientation of all new staff**
- **In the management of compensation and benefits, the NRA, through the Fair Wages and Salaries Commission, is committed to a fair and equitable compensation scheme based on comprehensive job evaluation and classification system**

Human Resource Development (1/2)

- **An HR Department sees to HRD with active participation of Management**
- **NRA is focusing on preservation of nuclear knowledge as a top priority and is set to ensure that knowledge and skills of the experienced nuclear professionals are transferred effectively to the younger generation**
- **NRA considers its employees as the most valuable asset and firmly believes that enhancing their knowledge and skills is an investment for the future of the Authority**
- **Fundamentals of Nuclear Security Workshop was held with International Nuclear Security (INS) of US-DOE for 4-8 September 2017 to address the Nuclear Security and Physical Protection component of Level 1 Training**
- **Basic Professional Training Course (BPTC) held in May and June 2018 to provide Level 1 Training on Nuclear Safety, Regulatory Control and Radiation Safety**

Human Resource Development (2/2)

- **SARCoN Kick off Workshop held in April 2018 to assist in Training Needs Analysis (TNA) with Experts from IAEA**
- **NRA is conducting TNA for its employees based on the IAEA four-quadrant competency model given in TECDOC-1254 and TECDOC-1794**
- **Fig. 3 below presents the Recruitment and Training process of NRA**
- **NRA currently has 57 staff including non-technical staff**
- **School of Nuclear and Allied Sciences (SNAS) trains relevant personnel to aid NRA recruitment efforts**

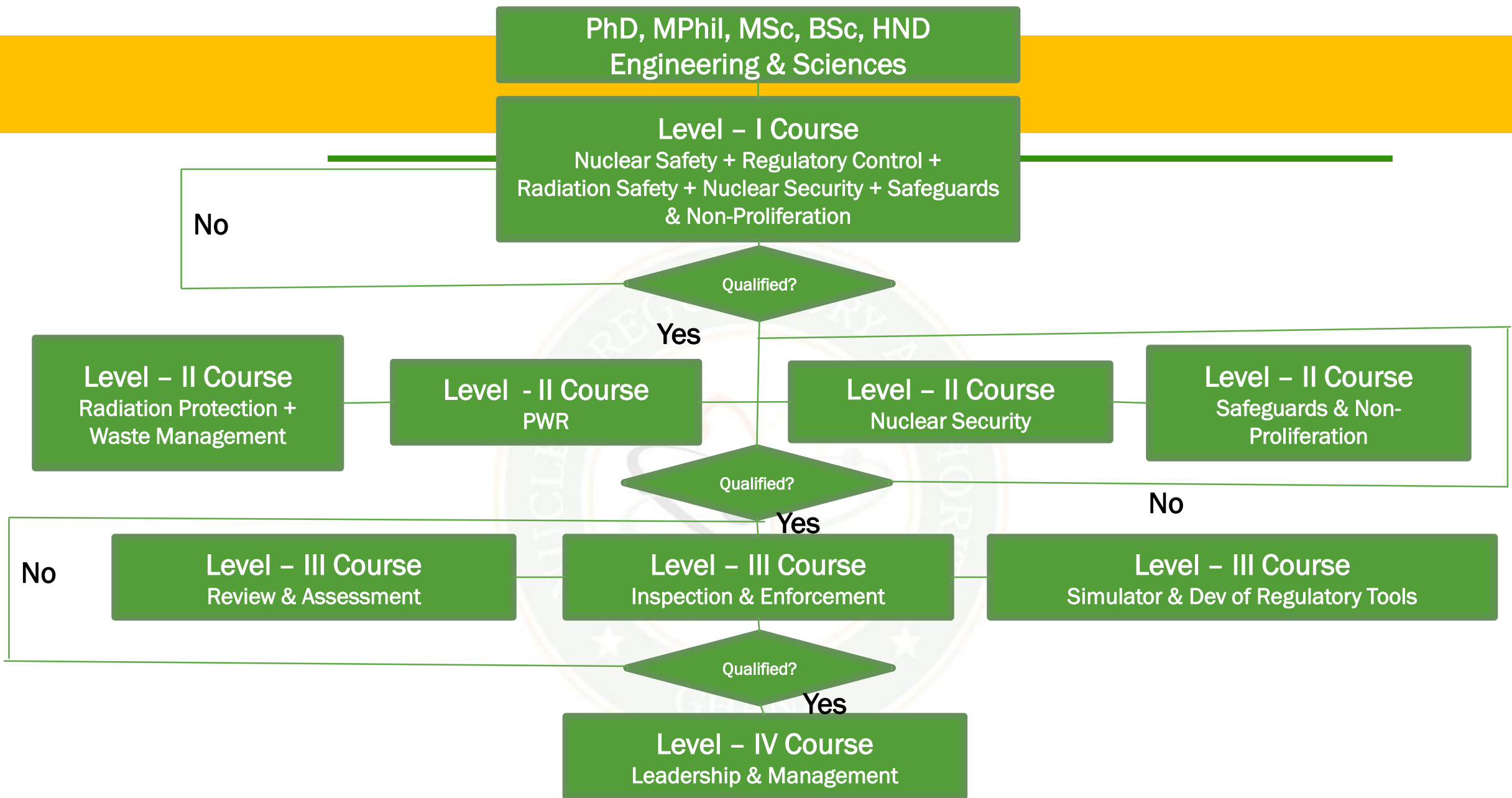


Fig 3: Recruitment and Training Process of NRA

REQUIRED REGULATIONS

- **The NRA is responsible for development of regulations and associated guidelines**
- **Stakeholders are involved adequately**
- **An Action Plan based on Act 895 has been developed to prepare and promulgate the required regulations, guidelines and procedures**
- **Licensing and Guidance During Construction and Operating Phases of a Nuclear Facility has been approved by the Board**
- **The draft regulations undergoing review and those yet to be drafted are presented below**

Draft Regulations Undergoing Review

- **Draft Radioactive Waste Management**
- **Draft Basic Radiation Control**
- **Draft Safeguards**
- **Draft Siting**
- **Draft Requirements for Technical Services**
- **Draft Regulation on the Security of Radioactive Sources**

Schedule for Remaining Regulations

YEAR	REGULATIONS TO BE PREPARED
2018	Licensing Nuclear Security Design
2019	Emergency Preparedness and Response Transport Construction of Nuclear Installations
2020	Nuclear Liability and Civil Damage Fees and Charges Integrated Management System for Facilities
2021	Commissioning of Nuclear Installations Operation of Nuclear Installations
2022	Decommissioning of Nuclear Installations Mining of Radioactive Materials
2023	Nuclear Power Generation in Ghana

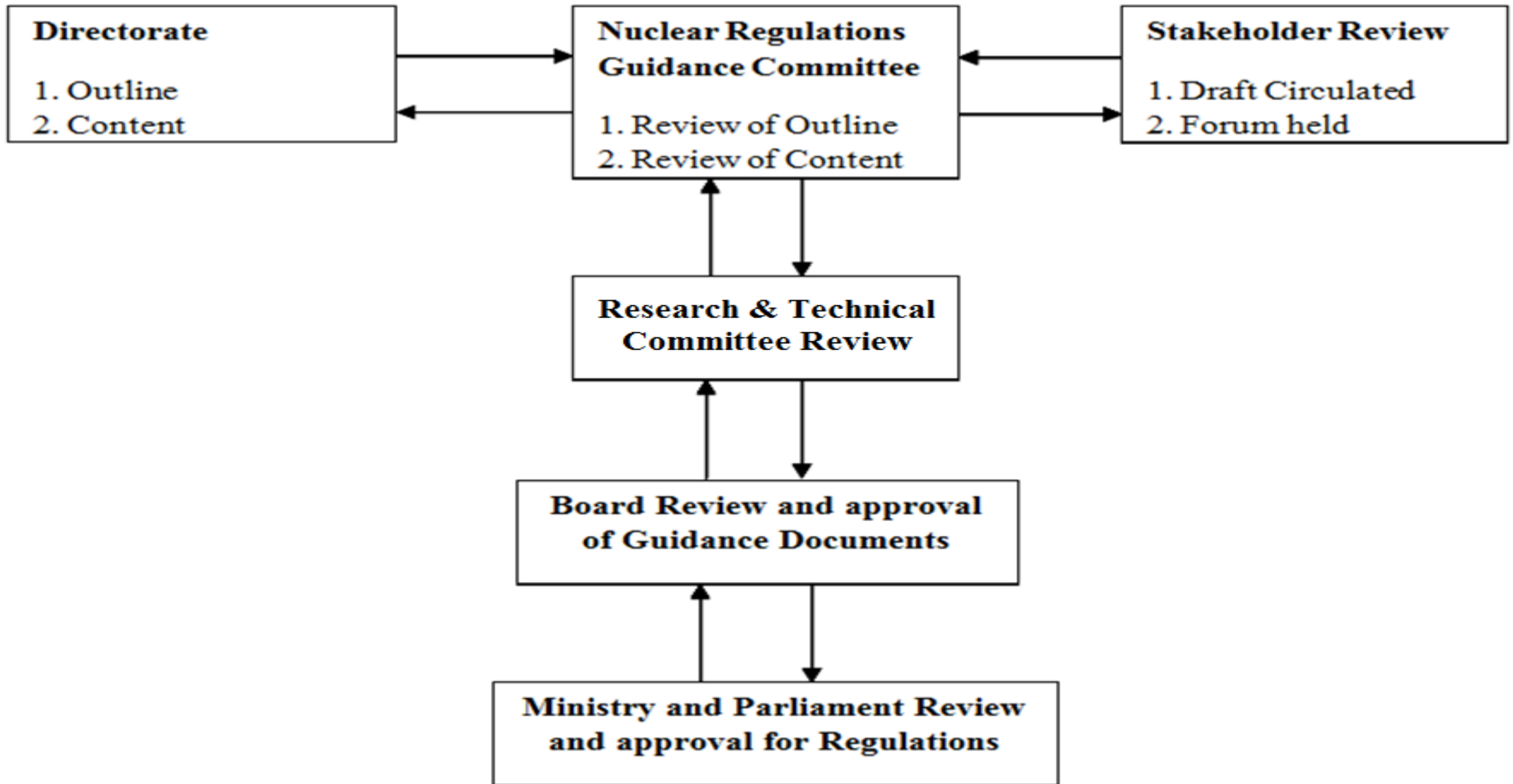


Fig. 4: Process for Review and Approval of Regulations

ONGOING COLLABORATIONS (1/2)

- **Member of Forum of Nuclear Regulatory Bodies in Africa (FNRBA) with Ghana Coordinating the TWG5 on Upgrading of Nuclear Safety in Research Reactors and serving as Vice Secretary**
- **Active Recipient of Regulatory Cooperation Forum (RCF)**
- **Have signed Bilateral Arrangement with US-NRC on Technical Information Exchange and Cooperation in Nuclear Safety Matters in September 2017**
- **Have Working Relationship with US-DOE on Nuclear Security (INS, ORS) and Safeguards (INSEP)**
- **Discussing with EC's INSC for support in 2019 and beyond; and benefitting from ENSTTI Training & Tutoring Programmes**
- **Have started discussions with Canadian Nuclear Safety Commission (CNSC) for support**

TRAININGS UNDERTAKEN

- **Fundamentals of Nuclear Security, Accra, 4-8 September 2017 , INS/US-DOE**
- **Workshop on Safety Regulations Development, 9-13 October 2017, IAEA**
- **Siting Review Workshop, Accra, 16-20 October 2017, US-NRC**
- **Legal and Regulatory Framework Development Workshop, 5-9 February 2018, IAEA**
- **FNRBA TWG5 – USNRC/IRDP Research and Test Reactor Inspection Training, 12-16 March 2018**
- **IRDP Research Reactor Inspection Training for four (4) Officers at Pennsylvania State University, 8-14 April 2018, IRDP/US-NRC**
- **Workshop on Leadership, Integrated Management System and Safety Culture, 16-20 April 2018, IAEA**

TRAININGS UNDERTAKEN & PLANNED (2/2)

- **SARCoN Kick-off Workshop, Accra, 23-27 April 2018, IAEA**
- **Workshop in support of the SSG-16 Implementation, 7-11 May 2018 at VIC, Vienna**
- **Inspector Training Course, Vienna, Austria, 7-18 May 2018**
- **BPTC (Part 1 & 2), 7-18 May; 18-29 June 2018, IAEA**
- **National Workshop on Licensing Process for NPPs, 13-17 August 2018, IAEA**
- **FNRBA-USNRC RTR Licensing Workshop, 27-30 August 2018, IRDP/USNRC**
- **IRDP Safety Evaluation Reviews, 10-14 September 2018, IRDP/US-NRC**
- **Nuclear Executive Workshop, Accra, 2019, US-NRC**

Ongoing Discussion on Collaboration with EC's INSC

- **NRA has started discussions with European Commission's INSC on the following seven tasks for 2018:**
- **Task 1 – Strategy, and its practical implementation, for enhancing the capacity and effectiveness of the National Regulatory Authority of Ghana**
- **Task 2 - Development of a quality management system for the National Regulatory Authority of Ghana**
- **Task 3 – Human resources development plan and training programme**
- **Task 4 - Basic safety principles, requirements and criteria for new nuclear reactors**
- **Task 5 – Enhancing the capabilities of the regulatory body for site licensing activities**
- **Task 6 – National strategy for radioactive waste management**
- **Task 7 – Transparency and Public Information**

RCF SUPPORT AREAS

- **RCF (EC-INSC) to organize expert mission for reviewing regulations and guidelines**
- **RCF (EC-INSC) to organize national workshop on communication plan development for the NRA**
- **RCF provider country to organize national workshop on EPR plan development, including experience-sharing**
- **RCF provider countries to support in conduct of inspections during siting activities**

CONCLUSION

- **Ghana seeks to adequately address her Safety, Security and Safeguards obligations through institution of an effective regulatory framework**
- **This platform of the Association of Ghana Industries is allowing us to inform the public of our ongoing activities**
- **We appreciate the assistance received from AGI in putting this Session together**

THANK YOU

