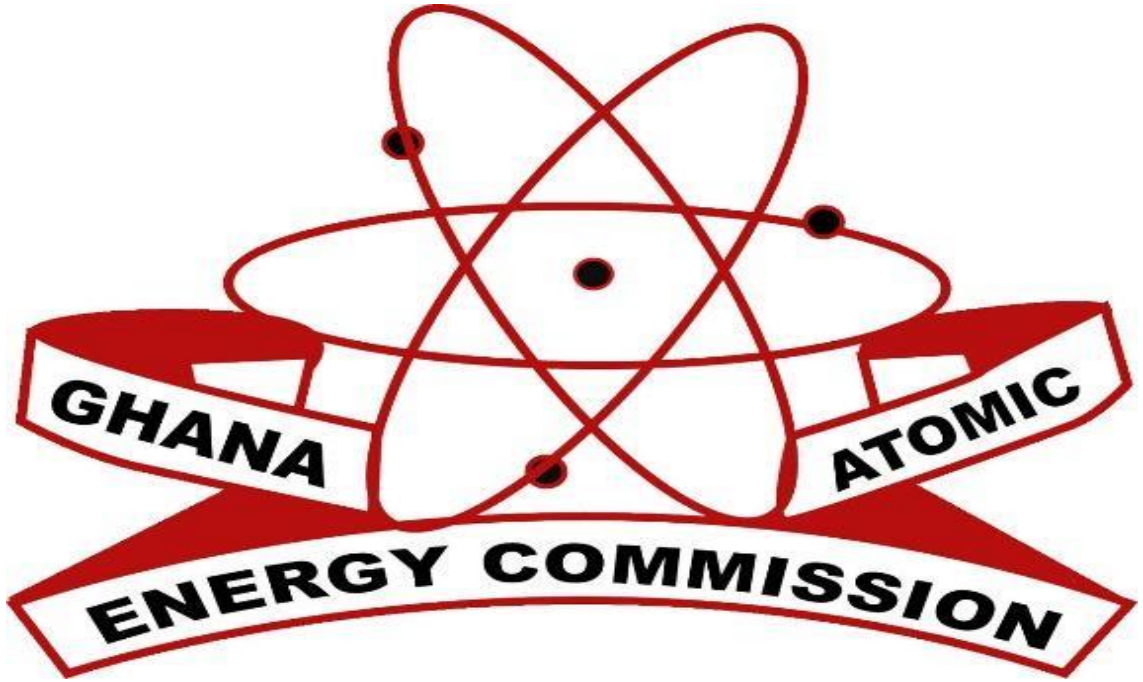

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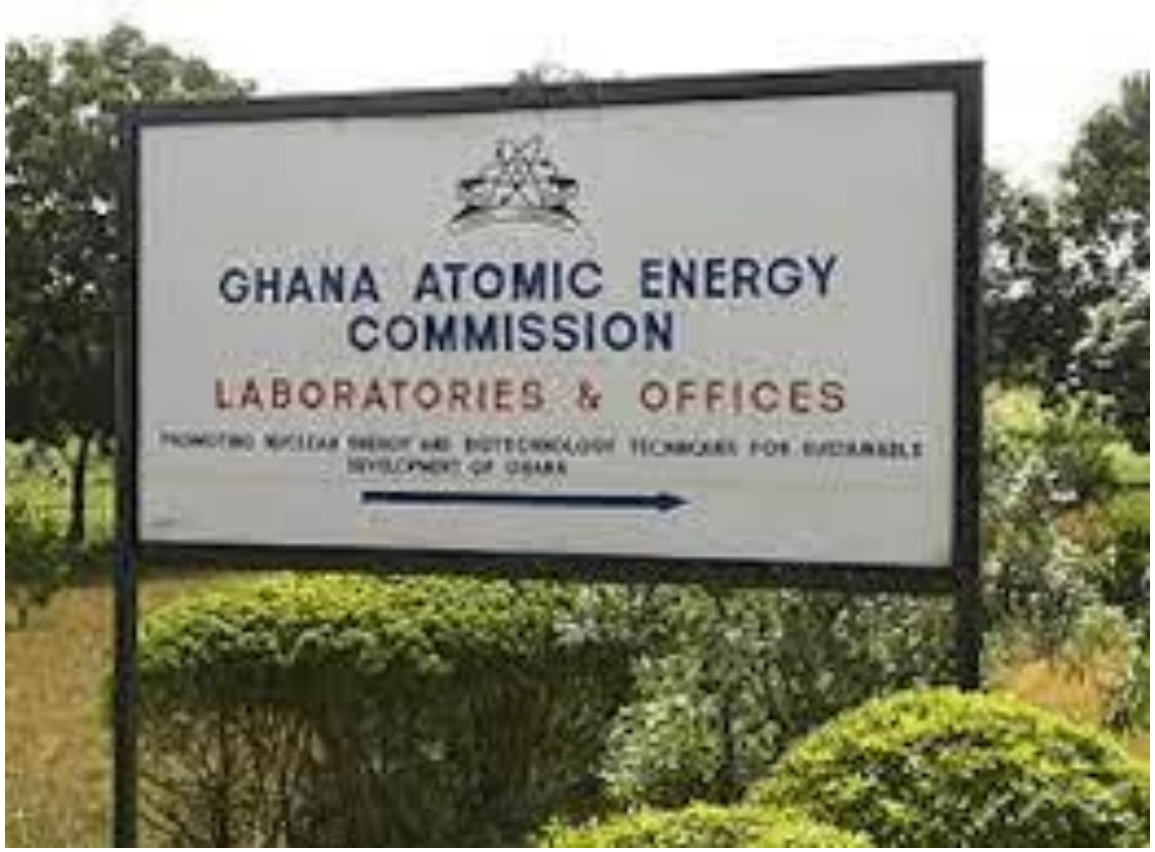
CONTENT



INTRODUCTION

The Ghana Atomic Energy Commission is a research institution with seven (7) institutes

- Radiation Protection Institute (RPI)
- Radiological and Medical Sciences Research Institute (RAMSRI)
- National Nuclear Research Centre (NNRI)
- Nuclear Power Institute (NPI)
- School of Nuclear and Allied Sciences (SNAS)
- Biotechnology and Nuclear Agriculture Research Institute (BNARI)
- Space Science

INTRODUCTION CON'D.

- The Ghana Research Reactor-1 (GHARR-1) is the only Research Reactor in the country
- The reactor is a commercial version of the Chinese Miniature Neutron Source Reactor (MNSR) design
- The MNSR design was originally a High Enriched Uranium (HEU) fuel of about 90.2%
- It was in 2016 converted from HEU to LEU of 13%
- The new LEU fuel is uranium dioxide at 13% enrichment with zircaloy-4 cladding.

Safety Routines at the GHARR-1

Periodic safety assessment of the reactor organized by the RPI and also the Nuclear Regulatory Authority

The Reactor has an output capacity of 30kW but operates around 18kW

Regular monitoring of the environment using radiation monitoring equipment in and around the commission

Periodic purification of deionized water used in the reactor

The reactor undergoes weekly maintenance to minimize maintenance demand and for further improvement

SAFETY FEATURES OF THE REACTOR

The inherent safety of the reactor is based on

- Its strong negative reactivity coefficient
- Its core coolability by natural convection
- Its in-built excess reactivity, which for clean and cold core is limited to 18kW

REGULATORY FRAMEWORK FOR LICENSING AND INSPECTION OF THE REACTOR

The radiation protection board was the sole regulatory authority for the purpose of nuclear and radiation safety before the institution of the Nuclear Regulatory Authority in 2015.

Pursuant to the regulatory requirements to obtain a license before operating the reactor, the National Nuclear Research Institute applied for the following licenses;

- Constructional license
- Source loading license, GHARR-1-95-04
- Criticality tests license, GHARR-1-95-05
- High Power test license GHARR-1-95-06
- Operator's license and Senior Operator's License, GHARR-1-95-01-3
- Provisional operational license GHARR-1-95-07

ESSENTIAL ELEMENT OF OPERATIONAL LIMITS AND CONDITIONS

Power limit <30kW

Minimum water level: 465cm

Temperature at the inlet of the core: <30˚C at 30kW

Maximum difference of temperature through the core:21˚C

Safety system setting for maximum power: 30kW

UTILIZATION OF THE RESEARCH REACTOR

Currently, the utilization programme of the reactor includes

- Neutron Activation Analysis (NAA)
- Education and Training of Students
- Collaborative research with researchers in the sub-region

CONCLUSION

The successful implementation of the Miniature Neutron Source Reactor (MNSR) and the basic radiation protection, nuclear safety and regulatory infrastructure indicates Ghana’s readiness in handling a Nuclear Power Plant Safely.

THANK YOU!