

Operational Safety of Ghana's Nuclear Power Plant: The Need for Radiological Safety and Security Plan

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Abstract

Activities within the siting and environment thematic areas of the Ghana nuclear power programme have been evolving since the inception of the programme. Through the Ghana Nuclear Power Programme Organisation (GNPPO), stakeholders including experts, civil service organizations, and the general public are being engaged periodically to enhance acceptability and sustainability. Operational safety of Ghana's nuclear power plant (NPP) is strongly tied to safety, security, and regulatory control systems. As a result, the Radiation Protection Institute in collaboration with the Nuclear Power Institute of the Ghana Atomic Energy Commission is developing a radiological safety and security plan for Ghana's NPP. The plan provides operational and decommissioning radiological safety and security measures.

1. Introduction

Thermal, hydro and renewables are the three (3) major power (energy) generating sources in Ghana, with installed capacities of 2786 MW, 1580 MW and 22.6 MW, respectively. Despite several interventions and policies in the energy sector to curtail the rising CO₂ emissions, the emission trend in Ghana and elsewhere remain significantly unchanged.

Fossil fuel energy production and consumption have been implicated as the main cause of the increased atmospheric CO₂ concentration and positive radiative force that warms up the earth [1]. Though the impact of climate change is global, the socioeconomic effects are much dire in Africa. Extreme weather conditions due to climate change have caused an increase in food security challenges in Africa with about 70% of Africa's population directly affected, making them food insecure [3]. As a result, conscious and concerted global action is required to overturn this looming catastrophe.

The government of Ghana in the year 2008, after a national consultation led by a Presidential Commission decided to add nuclear power to its energy mix. Ghana's nuclear power programme has since been evolving with series of programmes within the siting and environment thematic areas.

2. Safety plan development approach

- Expert engagement
- Civil service engagement
- Public engagement

2. Safety plan development approach

- Committee meeting: drafting of document with inputs from above groups
- Committee meeting: review of document
- Inter-committee meeting: consolidation of expert and other views.



Security model of NPP



3. Outcome

- Ghana achieved the IAEA's Milestone 1 in 2016.
- Ghana successfully completed the Integrated Nuclear Infrastructure Review with Expert Missions of the IAEA in 2017.
- A follow up of the INIR Mission was successfully completed in 2019.
- Draft Radiological safety developed.
- Development of security measures.
- Emergency response training (ongoing)