



Development of Radiation Safety Culture in Ghana: Impact on the Health of Radiation Workers and Quality Services

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Abstract

The Radiation Protection Institute (RPI) of the Ghana Atomic Energy Commission (GAEC), among other objectives provides radiation protection and safety training and consultancy on radiation exposure control; safety and security of radiation sources and effective radioactive waste management services. These activities are tailored towards the establishment of radiation safety culture at every Centre where radiation sources are applied. The ultimate goals are to ensure the safety and protection of radiation workers, the public and the environment from the harmful effects of ionizing radiation; and delivery of good quality services relating to radiation technology applications.

1. Introduction

In Ghana, radiation sources are applied mainly in the medical field for cancer diagnosis and treatment and internal imaging; in industry and civil constructions for level gauging and moisture content determination; and in agriculture for pest control etc. Other sectors where radiation sources are used in include the gold mines and oil and gas exploration fields.

The core functions of the Radiation Protection Institute (RPI) of the Ghana Atomic Energy Commission (GAEC) include research, training and delivery of technical services. Research is conducted on almost every sector of society where ionizing radiation makes an impact be it environmental monitoring, water resource management or air quality etc.

On annual basis, radiation protection and safety trainings are given to end-users and transporters of radiation sources. The Institute also undertakes technical and commercial services such as radiological content and impact assessment in food, water and beverages for industries that produce them. These activities are content of the RPI's quality management system designed to ensure safety and protection of workers; and delivery of quality services to clients.

2. Materials and Methods

Most operations of the RPI are conducted at the main site of the GAEC where the RPI and its laboratories are also located. Presented in Table 1 are the major activities, and the tools/ facilities required.

Table 1. Activities of RPI and tools required

	Main Activity	Sub-activity	Tool/ Facility
1.	Radiation Safety Assessment	<ul style="list-style-type: none"> ✓ Dose rate measurement ✓ Leak/contamination test 	<ul style="list-style-type: none"> ✓ Radiation survey meter (Radiagem) ✓ HPGe neutron and gamma detector, ✓ Alpha and beta detectors
2.	Environmental Monitoring	<ul style="list-style-type: none"> ✓ Dose rate measurement ✓ Leak/contamination test ✓ Soil-gas and radon measurement ✓ Indoor radon measurement 	<ul style="list-style-type: none"> ✓ Radiation survey meter (Radiagem) ✓ HPGe neutron and gamma detector, ✓ Alpha and beta detectors ✓ RTM 2200 (SARAD) radon spectrometer ✓ Radosys radometer
3.	Assessment of Natural Radioactivity: in Food/ Water/ Beverage/ Soil	<ul style="list-style-type: none"> ✓ Alpha radionuclides ✓ Beta radionuclides ✓ Gama radionuclides 	<ul style="list-style-type: none"> ✓ Alpha-gamma spectrometer ✓ Gross alpha-beta spectrometer ✓ Gamma spectrometer

3. Results

The quality management system of the RPI is the basis of:

- Effective radiation safety training modules,
- Standard operating procedures for both research and technical services resulting to standard and quality service delivery,
- Safety and protective mechanism for operators and transporters of radiation sources,
- Promoting and leading the radiation safety culture development in Ghana,
- Promoting civil applications of radiation science and technology among others.

Fig. 1 – 2 are some activities in pictures.

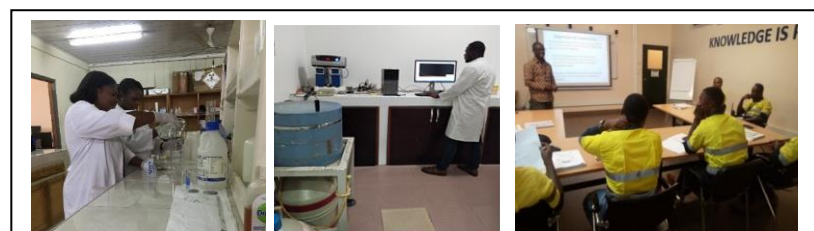


FIG. 1. Sample preparation and analysis in gamma lab

FIG. 2. Radiation safety training session

Conclusion

Radiation safety underlays every operation that uses radiation sources. To achieve this fundamental objective of the IAEA's basic safety standards [1], there is the need to establish safety culture at all Centers of radiation applications. Establishment of safety culture will not only ensure safety but will also improve on quality of services. In this regard, the RPI of Ghana through its quality management system is contributing immensely to achieve both safety and quality technical service delivery.

References:

- [1]. IAEA – Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (2014). General Safety Requirements Part 3 No. GSR Part 3.

Acknowledgment:

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