

# TANZANIA ATOMIC ENERGY COMMISSION

## RADIATION SAFETY INSPECTION TO STRENGTHENING REGULATORY EFFECTIVENESS

The Atomic Energy Act No. 7 of 2003 established the Tanzania Atomic Energy Commission as sole regulatory body responsible for regulating and controlling the safe and peaceful utilization of nuclear technology in the country. The Atomic Energy (Protection from ionizing radiation) Regulations, 2004 further specifies practices designed to ensure that unnecessary exposure of persons to ionizing radiation is avoided, that all exposures are kept as low as reasonably achievable and that all the dose limits specified in the radiation protection standards are not exceeded. This is achieved through the systems of notification, authorizations through registration and licensing, safety and security of radiation sources as well as regulatory inspections and enforcements. These activities are performed by the Commission with operational funds allocated by the Government of Tanzania. The Commission further provides other services namely individual monitoring; calibration services; education and training to radiation workers, public as well as law enforcers; and safe management of radioactive waste. Despite such achievement, still there are a lot to be done in order to strengthen the radiation protection infrastructure in Tanzania. These include issues such as gaps in our legislations, regulations and guidance, security of sources, enforcement of laws, etc. Efforts to strengthen regulatory control activities and radiation protection services are being done that will further improve the status of radiological protection infrastructure in Tanzania.



### **The National System of Notification and Register of Radiation Sources**

The Atomic Energy Regulations, 2004 clearly state that any person intending to initiate a practice or to possess a radiation source, shall submit a prior notification to the Commission of such an intention. This requirement has been published through the TAEC website, brochures, training of users and distribution of the law and its associated regulations. The Act further requires that every radiation user, radiation generating device and mobile radioactive apparatus be registered. In view of the above, it is clear that there is significant increase in use of radiation sources in the country and that this trend will keep on and hence the need to strengthen the radiological protection infrastructure in order to keep the potential radiation exposures as low as reasonably achievable.

## **Security of Radioactive Sources**

It is well known that if necessary security precautions are not taken into accounts nuclear and radioactive materials could create a radiological hazard to the personnel using the material, and a potential radioactive material release to the public and environment. In the context of the current widely dreaded possibility of nuclear terrorism, physical security of radioactive materials has emerged with a significant importance. Despite the fact that the Atomic Energy Act and associated regulations is being reviewed in respect to security of radioactive sources as explained earlier, the URT through the Commission did initiate security upgrade requirements for high risk sources as a condition of license renewal. The Commission has launched a program to collect all spent or disused sources and orphans from users' premises to the central storage facility, and has strengthened the security at the facility

The TAEC has established a planned and systematic inspection programme and inspection are carried out as part of the authorization process. Three major types of inspection are carried out and these include regular regulatory inspections; follow up inspections and unannounced inspections. The inspection frequency is based on the associated risk. For instance for radiotherapy and industrial radiography inspection are carried annually, while for diagnostic radiology equipment, the inspections are carried once in the two years. There are written inspections procedures for diagnostic X-ray facilities in Tanzania, which are used in carrying out inspection. Other inspections procedures for other practice have been developed. Inspectors use detailed inspection checklists for carrying out inspections. The inspectors after inspection prepare the full report of the inspection and submit it to the Technical Committee for review. The Director General ultimately approves and issues the report to the facility.

## **Regulatory Enforcement Action**

The Atomic Energy Act provide powers to the Commission to take necessary enforcement actions in the event of violation of safety requirements, which include warning letter for minor violations, strong warning letter for serious violations, suspension for those facilities with serious violations that jeopardize the safety of workers, patients and the public in general. The Act further requires that any person who contravenes, fails or refuses to comply with regulatory requirements, shall be guilty of an offense and liable on conviction to a fine of not less than US\$ 3,000 or to imprisonment for a term not less than three years or to both fine and imprisonment. The Director General approves all enforcement actions.

The TAEC been operating the central personnel radiation monitoring services to all registered workers occupationally exposed to ionizing radiation using thermoluminescent dosimeters (TLDs). This is in accordance with section of Atomic Energy Act, which requires every worker occupationally exposed to ionizing radiation to be regularly monitored for occupational radiation exposure. Currently, the centralized personnel radiation monitoring services cover about 1400 occupationally exposed workers from about 500 licensed radiation workplaces largely from

medical imaging practices; and their dose records are kept updated. Few radiation workplaces have been excluded from individual monitoring their occupationally workers due low risk radiation practices. The dose limit of 20 mSvy-1 is currently applied; and that workers are being monitored for a period of three months for those with medium risk and one month for high risk radiation sources such as radiotherapy. In order to ensure traceability of the dosimetry to the international measurements system, the National Calibration Laboratory (NCL) for ionizing radiation was established with the assistance of the IAEA and become operational in 1995. Three reference sources i.e. Caesium-137, Cobalt-60 and an X-ray machine are used to calibrate dose measurements and dosimetric equipment. A new facility with modern facility will be established by early 2018 through EU assisted project. The laboratory is a member of IAEA/WHO network of Secondary Standard Dosimetry Laboratories (SSDL); and provides its services to neighbouring countries such as Kenya, Uganda, and Zambia

### **Control of Public Exposure & Environmental Monitoring**

Potential sources of the natural occurring radioactive materials (NORMS) do exist in all substances and are present everywhere in the earth due to the content of uranium, thorium, potassium and other radioactivity emitting elements. However, the levels of these elements vary significantly depending on the geology of the area. Elevated levels of NORMS could pose significantly hazard to the public exposure. In view of the above, since 1995 to date TAEC has established 26 monitoring stations all over the country in order to determine contribution of NORMS to the public exposure; provide baseline information on levels of radioactivity in the environment, which is needed by the government and scientific community for the assessment of the impact of radioactive contamination on public health and on the environment.