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Occupational Radiation Dose Assessment of the Radioactive Waste Storage Facility at GAEC

ABSTRACT:

Occupational radiation dose of staff handling over 200 radioactive sources at the radioactive waste and work-place assessment in Radioactive Waste Management Centre (RWMC) of Ghana Atomic Energy Commission (GAEC) have been undertaken to determine levels of radiation safety. Firstly, five permanent workers were provided with thermoluminescent dosimeters (TLDs) to wear in between the chest and waist for skin and deep dose measurement. Thermoluminescent dosimeters (TLDs) badges were used for six months and the exposed thermoluminescent dosimeters (TLDs) were evaluated with HARSHAW 6600. Ambient equivalent dose rate ($\mu\text{Sv/h}$) was measured using dose rate meter (Canberra Radiagem 2000). Twenty-four control points closed to the source where staff are exposed to ionizing radiation were chosen. The maximum skin dose of Permanent workers was found to be 0.39 mSv of dose limit (25mSv), while the body dose was 0.66mSv of dose limit (1mSv). The observed mean value for radiation exposure for the period of September, 2016 to February, 2017 was calculated as $0.15\mu\text{Sv/h}$. Average ambient equivalent dose rate from radiation survey was lower than $20\mu\text{Sv/h}$. The result of the decay store ($0.9808\mu\text{Sv/h}$) and at the back of the decay store wall ($0.1124\mu\text{Sv/h}$), compared to the background radiation dose rate ($0.0241\mu\text{Sv/h}$) confirm the radioactive waste management principle. The radiation dose to occupationally exposed workers obtained in this work was far below The International Atomic Energy Agency (IAEA) standard for radiation worker of 20 mSv/ year and 1 mSv/ year for the public exposure. The study indicated that RWMC staff are exposed to insignificant to ionizing radiation at work and therefore are in safe working environment. It is However, recommended that regular environmental monitoring of radiation level is carried out at the facility to ensure safety of the staff and the public.

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