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## Industrial Application of Radioisotopes in Zimbabwean Industries: a Report on RTD Experiments in Cement Industry, Radon Monitoring in Coal and Fly Ash of a Small Thermal Power Plant and NDT Activities

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Major activities carried out in Zimbabwe with support from IAEA towards industrial applications of radioisotopes are presented. Au198 was used to determine the Residence Time Distribution (RTD) of limestone and clay in the production of clinker at PPC Colleen Bawn factory near Gwanda with the objective of determining hold-up and grinding efficiencies of a ball mill operating in a closed circuit regime. Three experiments were conducted using Au198 radiotracer and highly sensitive NaI(Tl) detectors for radiation measurement. In two experiments, 50 mCi of Au198 was used to tag limestone and clay which were fed into the ball mill at 85 tonnes/hr and 90 tonnes/hr respectively. In the other experiment 100 mCi of the tracer was used to tag limestone with a feedrate of 90 tonnes/hr. The estimated efficiency of the separator of nearly 90% showed that the performance of the separator is satisfactory. It was concluded that the grinding process of raw materials inside the mill was not optimal. In order to determine the amount of gamma radiation released to the environment by coal-fired thermal power generation and environmental gamma radiation levels we have monitored radon concentrations in a coal powered thermal power station (ZPC Bulawayo). Results obtained suggest that there were no high radon concentrations in the coal nor in the fly ash produced by the power plant. Four IAEA Fellows in NDT are currently doing their fieldwork before certification. NDT field work activities using radiography, ultrasound and liquid penetrate techniques were carried out and details of the field work carried out are presented.

### Country/Organization invited to participate

Zimbabwe

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