



Contribution ID: 247

Type: Oral Presentation

Characterization of UF₄ waste using gamma spectroscopy

Monday, 4 July 2022 12:00 (15 minutes)

The Republic of South Africa in 1991 signed the non-proliferation treaty (NPT) which regulates nuclear states in terms of usage of nuclear technology and materials. However, the implementation of nuclear safeguards requires nuclear material accounting and control (NMAC). These safeguarded nuclear material include uranium, thorium and plutonium. There are nuclear material of unreacted waste, packed in approximately 350 polystyrene overpack drums (210 L in volume) collected from the extraction end of the research reactor as a result of earlier nuclear activities prior to 1991. This waste is under the South African Nuclear Energy Corporation (Necsa). The aim of this research was to characterize this radioactivity of the unburnt UF₄ waste drums using gamma spectrometry technique. A Canberra BEGe detector with a Genie 2000 software was employed in this study to collect data. For each drum, activity was measured from the outside in three locations (top, middle and bottom), to identify the radionuclide therefrom. The results show that most in all the seven drums investigated, ²³⁵U and ²³⁴Pa were detected with activities of 1.18 ± 0.12 Bq/kg and 0.017 ± 0.002 Bq/kg, respectively. ²²⁸Ac & ²¹²Pb activities were not detected outside the drums confirming that the concrete encapsulation was effective in immobilizing these radionuclide.

Apply to be considered for a student ; award (Yes / No)?

YES

Level for award;(Hons, MSc, PhD, N/A)?

PhD

Primary authors: MATHUTHU, Manny (North West University- Mafikeng); Ms DESIREE, Tsholofelo Mokgele (North-West University (Mafikeng Campus))

Presenter: Ms DESIREE, Tsholofelo Mokgele (North-West University (Mafikeng Campus))

Session Classification: Nuclear, Particle and Radiation Physics

Track Classification: Track B - Nuclear, Particle and Radiation Physics