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Radiological assessment of solid waste for uranium ore processing in Nuclear Materials Authority, Egypt

Extensive exploration programs were conducted by NMA-Egypt for the discovery of radioactive and nuclear raw materials. Several, uranium occurrences were discovered such as Gattar, Eastern Desert, Egypt. Accordingly, the discovered uranium ore materials are subjected to mining and processing activities, As a result of these activities, different types of wastes are obtained. These wastes are mainly mining wastes, liquid effluents, and the solid residue. NMA had several trials towards the waste management of uranium solid residue to increase the process environmental impact. However, the environmental radiation impact as well as radiation hazard indices factors for Gattar rock mineralization and leaching residue samples after dissolution by sulfuric acid as well as the citric acid were investigated. This study estimated the activity concentration of radionuclides ^{238}U , ^{226}Ra , ^{232}Th , and ^{40}K maintained in Gattar rock and the leaching residue samples were measured using Gamma-ray spectrometer. The radium equivalent activity, the external-internal hazard index, the absorbed dose, the exposure rate, the outdoor and indoor effective dose for Gattar rock and the leaching residue samples were detected. The obtained results showed that only sulfuric acid leaching residue will need specific measures to control the radiological hazards before releasing to the environment rather than the residue obtained after the citric acid leaching.

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