

Jordan University of Science and Technology

Assessment of secular equilibrium and determination of natural and artificial radionuclide concentrations in the zone surrounding the site of the first nuclear reactor in Jordan

Authors: K. F. Al-Shboul, A. E. Alali, H. Y. AL-Khodire, I. M. Batayneh, and, A. W. Al-Shurafat

Abstract: High-resolution gamma-spectrometry and ICP-MS measurements were utilized to confirm the validity of secular equilibrium among the identified natural radioactive progeny of ^{238}U and ^{232}Th series. The measurements of ^{238}U , ^{232}Th , and ^{40}K concentrations, in the soil within 2 km range around the first nuclear reactor in Jordan, were close to the worldwide average levels. Among artificial radionuclides, only ^{137}Cs was detected but with very low traces. The dose rate and radiological hazard parameters were found to be close to worldwide average values and below the recommended limits. Our results indicate that secular equilibrium is unperturbed within and around the uncontaminated reactor site.