Proposed New Different Coincidence Neutron Detection Systems Using Monte Carlo Simulation

R.A. El-Tayebany[1], Mootaz Ebied Shalaf[2]

[1]*Nuclear and Radiological Safety Research Center, Egyptian Atomic Energy Authority, Cairo, Egypt*

[2]*National Center for Radiation Research and Technology, Egyptian Atomic Energy Authority, Cairo, Egypt*

The worldwide community faces significant and difficult challenges in safeguarding nuclear material. This work proposed new designs for coincidence neutron detection systems with different neutron detectors (^{3}He, Ar and BF_3) and calculations. The simulated systems include special nuclear material (SNM) with changing the neutron sources such as; AmLi, AmBe and ^{252}Cf. This work aims to determine the coincidence system efficiency and neutron distribution fluence for each proposed system in active mode. The results of the proposed systems were studied and compared to the active-well neutron coincidence counter (AWCC) employed in uranium testing using the code Monte Carlo N-Particle eXtended (MCNPX).

Key Words: MCNPX, Active Well (AWCC), ^{3}He-Gas Detectors, Ar and BF_3 gas filled detectors.