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POTENTIAL OF NEUTRON ACTIVATION ANALYSIS (NAA) AS AN INDIRECT METHOD TO UNCOVER THE FLUX OF AN *AMERICIUM-BERILIUM* SOURCE

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Neutron flux measurement in reactors and neutron sources are vital for control and, protection as the instantaneous power of a reactor is correlated to the neutron population during the simultaneous release of neutrons and energy in the fission process. Instrumentation based on neutron measurement is capable of determining the presence of redundant transient at low powers prior to developing a crucial problem. Such instrumentation is also fast and responds quickly to high power transients. Hence, the reactor safety circuits are blended to neutron detectors and their associated electronics. "Non-remote" neutron detectors are still involved with considerable biological risks of overexposing to neutron radiation while taking measurements. Under stable source conditions and for regular scheduled neutron flux monitoring, it is much safer to proceed with Neutron Activation Analysis (NAA). NAA is simply analyzing the emission spectrum of a sample, subsequent to irradiation by a neutron source, where the sample would not be destroyed to be considered as an advantage. Besides it could be used to uncover the neutron flux of the neutron source. In this investigation, the potential and the capability of measuring the neutron flux of the Am-Be neutron source established at the Department of Physics, Faculty of Science, University of Peradeniya, have been compared with ^{56}Mn, ^{64}Cu, ^{72}Ga, ^{116}In. Energy spectra of the samples of ^{56}Mn, ^{64}Cu, ^{72}Ga, and ^{116}In, irradiated by the neutron source were detected using the NaI detector whereas the initial activity and the respective half-lives were ascertained using the spectra received. The "Neutron Activation Equation" was adopted to determine the neutron flux of the neutron source using the given 4 samples, and the current neutron flux of the Am-Be neutron source was found as $(3.74 \pm 0.20) \times 10^7$ neutrons m^{-2} s^{-1} with reasonable detection accuracy. The outcome was expected to be adopt for a safer and an additional reliable method of measuring neutron flux of a given neutron source, especially when there is no proper instrument to measure the neutron flux directly, in Sri Lanka at present.