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detection for OSI - A study of non-He-3 neutron detectors

Within the past decade a significant shortage of He-3 and consequently an enormous increase in cost has occurred. Detectors equipped with He-3 are widely used in neutron detection applications, e.g. by first responders, during on-site inspections, and in other applications where nuclear and radioactive material has to be detected, localized and possibly identified. Therefore replacement materials need to be considered, selected, implemented in corresponding detectors, and thoroughly tested. Another development in the field of hand-held radiation detection devices focuses on simultaneous neutron and gamma ray detection with a single scintillator. These may lead to a new type of small and efficient hand-held devices, utilizing non-He-3 neutron detection. The outcome of a study of the scintillators CLYC and CLLB which allow a simultaneous measurement of gamma and neutron radiation will be presented in this contribution. Additionally, results with a neutron detector implemented in a wearable Radiation Isotope Identifier Device (RIID), the D3S from Kromek, will be shown. Differences in the detection of neutron radiation will be explored and analyzed regarding their potential use in on-site inspections.

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