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Alternative Neutron Detection Technology for Homeland Security RICHARD KOUZES, EDWARD SICILIANO, Pacific Northwest National Laboratory — Neutron detection is an essential aspect of interdiction of radiological threats for homeland security purposes since plutonium is a significant source of fission neutrons. Radiation portal monitoring (RPM) systems, of which there are thousands deployed for homeland security and non-proliferation purposes, currently use ^3He gas-filled proportional counters for detecting neutrons. Due to the large increase in use of ^3He for homeland security, the supply has dwindled, and can no longer meet the demand. Consequently, a replacement technology for neutron detection is required in the very near future. In addition to alarming on the presence of actual neutron sources, homeland security applications also have a strict requirement for limiting neutron false alarms produced by a detector. This constrains any possible replacement neutron detection technology not to generate false neutron counts in the presence of a large gamma ray-only source. Of the currently available neutron detection technologies, BF_3 -filled proportional detectors, boron-lined proportional detectors, ^6Li -loaded scintillating glass fiber, or non-scintillating coated plastic fiber detectors are the possible replacements for ^3He detector technology—if they are proven to have appropriate capabilities.

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