

Purpose: To determine the behavior of neutron survey meters under conditions that are not representative of calibration conditions; specifically, when performing measurements in pulsed fields consisting of both photons and neutrons as opposed to an AmBe or Cf-252 source. It is well understood that not all types of photon survey meters are suitable for use in pulsed fields, and experience suggests that this may also be the case for measurements made using typical neutron meters.

Methods: A series of measurements were performed to evaluate the response of five different neutron survey meters. The first measurements evaluated their response in monoenergetic neutron fields between 50 keV and 18 MeV produced using a Van de Graaff accelerator. Dose conversion factors were applied to the known neutron fluence and the results were in turn compared to the measured dose rates. These results were also compared to the energy response curves provided by the manufacturers. The second set of measurements focused on photon rejection. The manufacturer's photon rejection specifications were first verified through Cs-137 exposures at dose rates of up to 10 Sv/h. These results were then compared to photon rejection measurements from exposures in both a 6 MV and 18MV medical accelerator field.

Results: A complete analysis of the results has not been completed at the time of submission. Initial results show that some neutron survey meters commonly used in accelerator facilities may be unreliable and susceptible to spurious high readings when used in the presence of pulsed photon fields, due to the relatively high peak photon dose rates during pulses.

Conclusions: The conclusions will indicate the extent of any variations in neutron survey meter response resulting from use under non-standard conditions and discuss what impact this may have for radiation surveys performed at accelerator facilities.