

Comparison of Passive and Active Neutron Dosemeter Measurements around a Spent Fuel Cask



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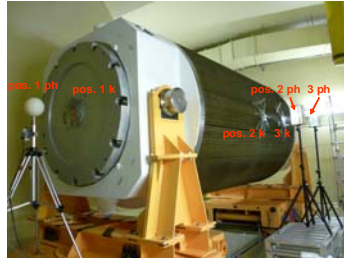
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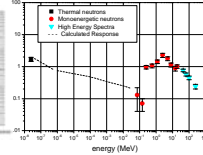
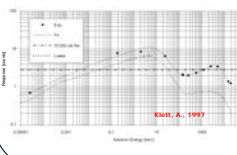
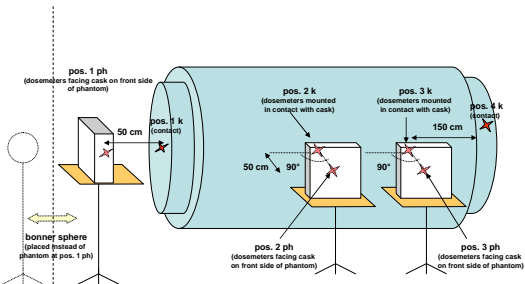
1. Introduction

Radiation protection around a spent fuel cask presents a metrological challenge due to the presence of an inhomogeneous mixed radiation field of neutrons and photons. In particular, the neutron spectra of such fields strongly depend on the measurement position with respect to the radioactive content and the shielding of the cask. The energy range of neutrons can vary from thermal to several MeV.

An intercomparison of the response of different neutron detectors was performed in several measurement positions around a spent fuel cask filled with 4 MOX and 8 UO₂ 15x15 PWR fuel assemblies at the nuclear power plant Gösgen (KKG) in Switzerland.



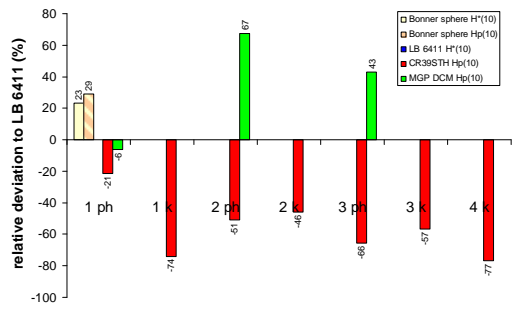
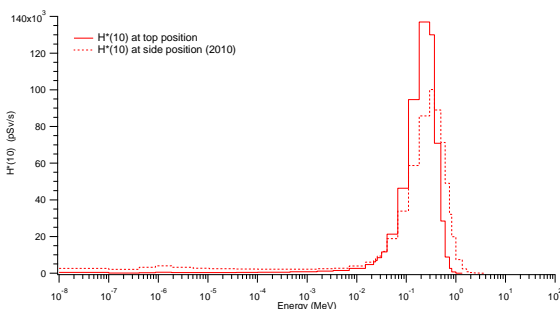
2. Neutron Detectors



The instruments used in the study were active and passive neutron detectors calibrated either for ambient or personal dose equivalent.

3. Results and Conclusion

The aims of the measurement campaign were to compare the responses of the radiation instruments and to study the ratio between the results of the measurements taken in contact with the cask and the personal doses, which persons would receive standing at a distance of 0.5 m.



It has been shown that the indications of the neutron detectors are dependent on the neutron spectra due to their different energy responses and the spectra seem to vary around the cask. However, it has been shown that the routinely used active detectors are reliable instruments and taking into account the measurement uncertainties they deliver conservative measurement results.