The detector

The Rem counter is a neutron detector which measures the neutron dose-equivalent rate with a rem response in the energy range from thermal to 15 MeV. The counting assembly consists of a BF$_3$ proportional counter tube placed inside a moderator-absorber unit made of polythene and borated plastic as designed by Andersson and Braun. The neutron sensitivity of the Rem counter is about 2.5 counts/sec per mrem/h. The instrument is optimized for low-level neutron measurements.

Technical features

The pulses from the BF$_3$ counter are fed through high-quality amplifiers to a discriminator. The high voltage required by the counter is produced by a small encapsulated power supply, commercially available. The amplifiers and high-voltage supply, which are remote-controlled, are mounted as close as possible to the BF$_3$ counter in order to minimize the influence of parasites. The components are mounted on a printed circuit board, which is located in a circular housing clamped to the moderator. The moderator is mounted on a standard chassis system for radiation monitors, into which associated electronics and power supply can be plugged. The gain of the amplifier and the high voltage is controlled from a mechanical register which can be pre-scaled. A scaler-memory arrangement with analog output gives a d.c.-level, which is proportional to the number of counts received during a fixed time interval. The analog output is used for data logging and analog recording.

Use on the CERN site

Thirteen Rem counters are at present installed to measure the contribution of neutrons to the stray radiation levels on the CERN site.

References

Further information can be obtained from J.W.N. Tuyn, Health Physics Group, CERN, Tel. 4581.