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TOPICAL SESSIONS
Reports of Co-Chairmen for Highlight Sessions

T-13: New Techniques in External Dosimetry

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Chair and Keynote: A. Waker Co-Chair: X. Ortega

The measurement of external radiation fields is carried out to meet regulatory requirements, as well as a tool in work management and dose control. Most of the radiation detection systems used at present are based on well-established and known principles and, completely new methods are not foreseen in the near future. However, new developments related to advances in processing, electronics and new materials technology appear constantly.

Some answers to “old” problems in external dosimetry, such as personal neutron dosimetry and dosimetry in mixed radiation fields, were presented in the session. These advances ensure a better compliance with regulation and optimization of work management.

The **keynote,** presented by **Dr. A.W. Walker** from the Atomic Energy of Canada Limited, gave an overview of the newer techniques in external dosimetry. Dr Walker reviewed in his presentation the trends affecting developments in external dosimetry:

- Cost and regulation.
- Better workplace dose control.
- Better dosimetry information management.
- Better measurements in mixed radiation fields.

Subsequently, he selected some of the new developments, namely,

- New detectors: optically stimulated luminescence and direct ion storage.
- New signal processing: data logging and interfacing, small multichannel analysers.
- Spectroscopic dosimetry: portable gamma spectrometers, LET spectrometers.

Finally, the importance of radiation standards to support external dosimetry improvements was enhanced:

- Standards fields to study detector energy response.
- Realistic fields to improve device calibration.
- Computational dosimetry for radiation transport studies and modelling of dosimetric quantities.

The first communication was presented by **Dr. H.M. Kramer** (Germany) and dealt with some problems due to lack of electronic equilibrium in high-energy electron and photon fields. Experiments carried out at PTB lead to a modification of the

irradiation conditions for calibration purposes avoiding these problems and permitting a more consistent calibration directly in terms of the operational quantities H*(10) and Hp(10) in high energy mixed fields. The range of energies studied stretches up to 7.0 MeV.

Dr. N. Vane (Austria) described the High Temperature Ratio-method developed at the Atominstitute of the Austrian Universities for determination of the average LET in mixed radiation fields. The method uses the change of the peak height ratios in LiF glow curves in dependence on the radiation LET. The method has been successfully applied to space missions in aircrafts and in therapeutical proton beams. Results showed a good agreement with TEPC based LET spectrometer measurements.

Dr. C. Wernly (Switzerland) introduced a new application of the so-called Direct Ion Storage (DIS) detector for neutron and mixed neutron-gamma fields. The characteristics and preliminary results of a first prototype are described. The combination of two ion chambers with different wall materials provided a nearly constant energy response in the range (0.1-10) MeV. Work is in progress for the trial of a new design for radiation dose measurement in mixed fields.

The last communication was given by **Dr.K.Aoyama** (Japan) who presented the performance of two types of new electronic personal dosemeters (EPD) for gamma and mixed, gamma, beta and neutron dose measurement, respectively. A comparison between these EPDs and film badges measurements at several nuclear power plants showed very good agreement between both dosimetric techniques. As a consequence of such study, the Japanese Atomic Power Company has decided to substitute the film badge by the new devices as a dose record dosemeters.