

Dose Assessment and Dose Registry

João Garcia Alves

The activity of the Dose Assessment and Dose Registry unit is directed towards the assessment of doses to the Portuguese population due to several types of exposure to external radiation.

The activities developed in 2006 were mainly concentrated on the performance of the individual monitoring service of ITN in the fields of individual and environmental monitoring. Care was also given to the Chairmanship of Subgroup1 of EURADOS WG2, including the co-preparation of a proposal on the review of the European technical recommendations submitted to EC-DGTREN.

In 2006 the main activities were focused on:

Assessment of the occupational radiation doses: In 2006 the Individual Monitoring Service (IMS) of ITN provided whole body dosimeters to approx. 3,200 workers on a monthly basis. In mid 2006 a recently appointed trainee and a MSc student started the performance tests of two different TLD varieties of extremity dosimeters with the aim of establishing the appropriate technique for this type of measurement, which is due to be ready in early 2007. Performance tests of the whole body dosimeter were also re-evaluated, and improvements to the dose evaluation routine were considered. Although Quality Assessment/Quality Control has always been of the utmost importance to the IMS, the necessary work for accreditation according to the ISO/IEC 17025 was resumed.

Improvements to the Central Dose Registry and analysis of the occupational exposure data:

In 2006 the CDR has increased the frequency of data collection from the dosimetry companies operating in Portugal. At present, the CDR contains the

accumulated dose data of occupationally exposed workers from 1957 to the first semester of 2006, inclusive. The analysis of the occupational exposure data is also one of the aims of this work.

Assessment of the cosmic radiation dose received by aircrew: A collaboration with the Serviço de Ginecologia e Obstetrícia of the Hospital da Força Aérea Portuguesa, for the estimation of in-flight cosmic radiation doses received by aircrew in military transport flights with specific software programs was maintained. A research project entitled *Cosmic radiation dose assessment for military transport aircraft crew and at ground level*, (ref. PTDC/FIS/72617/2006) was submitted to Fundação para a Ciência e Tecnologia for financial support and is presently under evaluation.

Assessment of the environmental gamma radiation dose to the Portuguese population: This Unit collaborated to the Environment Radiological Surveillance Programme of the entrusted to ITN, by regularly performing measurements of the environment dose equivalent rate in the ITN *campus* and in several locations in Portugal. A poster on the setup of this activity was presented.

On-going collaboration in international working groups was developed in the framework of both **EURADOS** (European Radiation Dosimetry Group) and **ESOREX** (European Study on Occupational Exposure) activities.

Collaboration in a national working group on radiation protection created by the Portuguese institute for accreditation was initiated in the end of 2006.

Research Team

Researchers

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Students

L. FREIRE, MSc student

Technical Personnel

A.M. CALADO (PEPAP Trainee, since 31-May-06)
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EURADOS WG2: Harmonisation of Individual Monitoring in Europe

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Objectives

The Eurados Council assigned to Working Groups 2 two tasks: to revise the EUR 14852 document and to prepare a proposal on regular self-sustained intercomparisons of personal dosimeters.

Both tasks should be completed until the end of 2006. Should there be a call for a tender issued by the European Commission, Directorate-General Energy and Transport (EC-DGTREN) on the revision of the EUR 14852, Subgroup 1 should be prepared and present a proposal.

Results

EURADOS Working Group 2 on *Harmonization of Individual Monitoring in Europe* two tasks to be completed until the end of 2006: the review of the EUR 14852 document entitled *Technical recommendations for monitoring individuals occupationally exposed to external radiation*, and the preparation of a proposal on the organization of self-sustained intercomparisons for whole body and extremity dosimeters in Europe, on a regular basis.

WG2 was chaired by V. Kamenopoulou from GAEC and two subgroups were created for the preparation of each task Subgroup 1 and Subgroup 2, respectively chaired by J.G. Alves and M. Figel. Both activities were organized and successfully completed.

In September 2006, the EC-DGTREN issued a call for a tender on the *Establishment of the European Technical Recommendations for Monitoring Individuals Exposed to External Radiation*.

Subgroup 1 prepared and submitted a proposal to EC-DGTREN in early November which is presently under evaluation. A Consortium agreement was established

between GAEC and EURADOS comprising a Task Group (GAEC, ITN, HPA, NRG, PTB, RPII and ENEA) for the preparation and writing of the new document and an Extended Group of European Countries (with contact persons in all member states and candidate member states) for inputs of necessary information and comments on the drafts. Liaisons with international and European organizations like the IAEA, IEC, ISO, ICRU, ICRP, ESOREX, EUROMET and EAN was also ensured.

Subgroup 2 analysed the feasibility of EURADOS to organize self sustained intercomparisons on a regular basis. All important issues were addressed, a budget was prepared and an organization group for launching the first intercomparison was suggested.

Although several issues have been identified and deserve further attention, the activity of both Subgroups finalized and a report to the EURADOS Council is due for January 2007.

Published work

V. Kamenopoulou et al., Aspects of Harmonization of Individual Monitoring for External Radiation in Europe: Conclusions of a EURADOS Action. *Radiat. Prot. Dosim.* 118, 2, 139-143 (2006).

GAEC-EURADOS Consortium. Proposal submitted to the European Commission, Directorate-General Energy and Transport: Tender n. TREN/H4/98-2006, on the Establishment of European Technical Recommendations for Monitoring Individuals Exposed to External Radiation, presently under evaluation (November 2006).

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Individual Monitoring Service: QA/QC, improvements and developments

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The Individual Monitoring Service (IMS) at ITN is based on a TLD dosimetry system, that consists of two 6600 Harshaw TLD readers and on the Harshaw 8814 TL card and holder containing two LiF:Mg,Ti (TLD-100) detectors for the evaluation of Hp(10) and Hp(0.07). In 2006 the IMS provided monitoring for external radiation to 3222 workers from 216 facilities in Portugal, on a monthly basis.

In 2006 two varieties of extremity ring dosimeters, based on LiF:Mg,Ti (TLD-100) and LiF:Mg,Cu,P (TLD-100H) both from Thermo Electron Corporation (USA), were tested for compliance to the requirements issued in the national legislation and the ISO 12794 standard. The set up of a methodology for monitoring extremities is currently under development and was an output of the work assigned to a trainee integrated in the IMS and to a MSc student as part of the preparation of his thesis.

Further improvements were also introduced to the QA/QC programme currently in use at the IMS. The full time involvement of a trainee allowed the identification and description of the main tasks and processes performed at the IMS. The aim of applying for accreditation according to the ISO/IEC 17025 Standard and related activity was resumed.

Assessment of the Environmental Gamma Radiation Dose to the Portuguese Population

J.G. Alves, L. Novais, S. Rangel, A.M. Calado

Environmental monitoring for evaluation of the gamma radiation dose to the Portuguese population is one of the tasks assigned to ITN for the accomplishment of Article 35 of the Euratom Treaty. This Unit collaborated to the environmental surveillance of Portugal by performing measurements of the ambient dose equivalent rate with passive dosimeters (TLDs) evaluated on a quarterly basis. The measurement of the ambient dose equivalent rate was performed by the individual monitoring service using the same dosimetry system as described above. The methodology was adapted to the environmental exposures, e.g., implementation of site-specific corrections for fading and sensitivity changes, longer monitoring periods.

In 2006 a net of measurement sites located at meteorological stations (Bragança, Beja, Castelo Branco, Faro, Funchal, Penhas Douradas, Portalegre and Vila Nova de Gaia) and covering the whole country was established. Dosimeters were issued and evaluated on a quarterly basis. The three measurement sites monitored at ITN during 2005 were used as reference points and evaluated on a monthly basis.

Assessment of the Cosmic Radiation Dose Received by Military Aircrew in Transport Missions

J.G. Alves, J. Mairos¹

The estimation of cosmic radiation doses received by aircrew in military transport flights is one of the aims of the collaboration established between ITN and the Serviço de Ginecologia e Obstetrícia of the Hospital da Força Aérea Portuguesa. Specific software programs are used and special attention is given to the case of a pregnant crew member.

In 2006 a research project entitled *Cosmic radiation dose assessment for military transport aircraft crew and at ground level*, ref. PTDC/FIS/72617/2006 was prepared, submitted to Fundação para a Ciência e Tecnologia for financial support and is presently under evaluation.

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