

INTERNAL DOSE CALCULATION

Todo, A.S.; Rodrigues Junior, O.; Lima, V.R.

Centro de Metrologia das Radiações - IPEN/CNEN-SP

Keywords: dosimetry; internal dose; internal monitoring.

An internal monitoring program was carried out for personnel entering radiological areas with potential intakes resulting in a committed effective dose. The dose calculation follows the measurements of the activity in excreta or in body tissues. These calculations are based on the mathematical models recommended by the International Commission on Radiological Protection, and adopted by the Brazilian Nuclear Energy Commission, according to the type of the radionuclide and the practice. The in vivo and in vitro monitorings are useful for both routine control and in the investigation of known contaminations.

The internal monitoring of workers that handle unsealed sources is performed at least once in a year, according to the radiation protection program, here called "management monitoring". Most of gamma emitting radionuclides as ^{131}I , ^{99}Mo , $^{99\text{m}}\text{Tc}$, ^{67}Ga , ^{51}Cr , ^{201}Tl , ^{153}Sm , ^{60}Co , ^{137}Cs , ^{203}Hg and $^{100\text{m}}\text{Ag}$ are monitored by the in vivo technique. The alpha emitting radionuclides as U, ^{232}Th and ^{241}Am are monitored by the in vitro technique, which is applied for the workers at the fuel cycle facilities and waste management installations of the institute.

During the period 2002-2004, a total of 2729 evaluations were performed for dose assessment, as part of the internal monitoring program. Year Dose evaluations 2002 825 2003 1008 2004 896 No worker has received dose higher than the annual limit on intake.

THERMOLUMINESCENCE DOSIMETRY

Manzoli, J.E.; de Campos, V.P.

Centro de Metrologia das Radiações - IPEN/CNEN-SP

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The Thermoluminescence Dosimetry Laboratory (LDT) has implanted the quality system based on ISO/IEC 17025 [1]. Around 1500 users are individually monitored monthly for external exposure, using trunk and extremity thermoluminescence dosimeters. There are almost 100 points of environmental thermoluminescence dosimetry and 200 points of workplace monitoring. LDT work has been released in international congresses. (TAB.1) presents the number of TLD personal monitoring evaluations for different types of institutions. (TAB.2) presents the number of TLD evaluations for different applications.

TABLE 1 - number of TLD personal monitoring evaluations at different kinds of institutions.

Users in	2002	2003	2004	%
Industries	3054	2537	2385	15
Research Institutions	14320	13771	12240	75
Hospitals	1909	1993	1705	10
Total	19090	18120	16330	100

TABLE 2 - number of TLD evaluations for different applications.

TLD Evaluation	2002	2003	2004
Personal	19090	18120	16330
Environmental	433	330	370
Area	454	457	620
Research/Tests	8123	11300	12500
Total	28100	30207	29820

The routine individual monitoring service for external exposure at LDT satisfies completely the regulatory norms of CNEN (Brazilian Nuclear Energy Commission). Reference: [1] ISO/IEC 17025:1999. General Requirements for the Competence of Calibration and Testing Laboratories. ISO, Geneva (1999).