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ENVIRONMENTAL DOSIMETRY IN THE RADIATION PHYSICS AND METROLOGY LABORATORY (LAF-RAM)

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Introduction: The values of environmental equivalent dose H*(10) using thermoluminescent dosimeters in the Radiation Physics and Metrology Laboratory (LAF-RAM) from 2019 to 2020 are presented. Fifteen measurement points are monitored on a regular monthly basis. These include sensitive areas such as the control room of the Laboratory of Calibration Dosimetry (LCD) which contains a ^{137}Cs source. Another sensitive area is the storage room for radioactive research sources of the LAF-RAM. Because of the relevance and characteristics of the LCD, storage room, and the place where the Laboratory of External Dosimetry (LDE) keeps the dosimeters of the service it was considered to measure the dose equivalent H*(10) with a Geiger Müller detector.

Material and method: The H*(10) dose information was collected through the dose reports provided by the LDE of LAF-RAM since 2019, when it started its environmental monitoring with thermoluminiscent dosimeters (TLD). Dosimetric information from the reports for each period was used to obtain a trend of the H*(10). It was compared in time to the average, and was plotted to three and two times the standard deviation for all measurements and for all points of interest. The monitored points are distributed in practically all areas of the LAF-RAM, as follows: reception, in this area dosimeters of the LDE service are received as well as the monitors of LCD service area to be calibrated; the library; the office area (two positions); Director; storage room for warehouse cafeteria, conference room, corridor adjacent to X-ray room, LCD control room, source storage room door and in LDE with four measuring points: the storage area of the dosimeters and the working area. Additionally, an active area detector Graetz model X5DE was used to measure the environmental dose equivalent in the area of the LDE. The work tables, reading area and dosimeters storage cabinets were measured. The same detector was used to measure H*(10) in the storage room, and LCD. It was not part of this work at this moment to perform occupational monitoring analysis.

Results: Two outliers were found: one corresponding to the corridor adjacent to the X-ray room in 2019. During this period, quality control of Xray equipment was performed. The other one corresponds to the point office 1. During this period all results were higher compared to the previous months, but maintenance of dosimetric reader has been done in the the meantime i.e. the outliers most likely is due to a proplem with the dosimetic reader fixed by the maintainance.

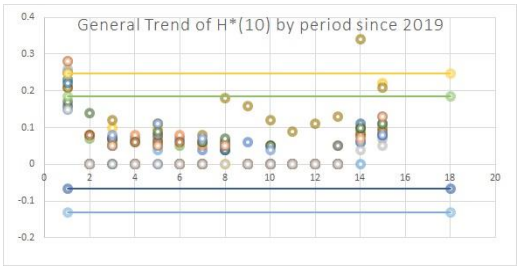

Figure 1. General trend of H*(10) 2019 and 2020.

The LAF-RAM annual average H*(10) for 2019 is 0,50 mSv/year with a standard deviation of 0,35 mSv/year. For 2020 the results of H*(10) is 0,70 mSv/year with a standard deviation of 0,46mSv/year. The results of H*(10) for LCD control room, storage room and LDE room, comparing TLD with area monitor is shown in table 1.

	H*(10) mSv/year	
Measuring points	TLD	Active detector Graetz X5DE
LCD	0,51	1,00
Storage room	0,72	1,50
LDE	0,45	1,26

Conclusions: With TLD the average of ambient dose equivalent at LAF-RAM between the years 2019 and 2020 was 0,60 mSv/year. During the study period, the results do not represent any risk to public i.e. visits from stakeholders or custumers to the laboratory including the sensitive areas.