

PROFESSIONAL EDUCATION IN RADIOLOGY: CERTIFICATION PROCESS OF EXTERNAL INDIVIDUAL DOSIMETRY LABORATORIES IN BRAZIL

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Abstract: Workers occupationally exposed to ionizing radiation (IOE) are required to be individually monitored, on a monthly basis, by External Individual Monitoring Services (SMIE). The objective of the work was to address the certification process of services offered by external individual dosimetry laboratories in Brazil with the Testing and Calibration Services Assessment Committee (CASEC) linked to CNEN's IRD, as well as associated details, with a view to education professional to understand the flow for students and schools. The methodology involved a bibliographical search for scientific articles, in addition to online open registration data platforms belonging to the bodies. Subsequently, a technical visit was carried out. The results showed that the license to operate a SMIE must be issued by the IRD, in a system established by the Directorate of Radioprotection and Nuclear Safety (DRS/CNEN). The IRD sector responsible for the process and systematic certification and/or accreditation of SMIE in Brazil is the Testing and Calibration Services Assessment Committee (CASEC). Obtaining this certification consists of analyzing the documentation delivered and after approval, the technicians responsible must pass a qualification exam. The SMIE is subject to the External Individual Monitoring Service Performance Assessment Test, by the IRD National Ionizing Radiation Metrology Laboratory. In conclusion, all SIMIE for whole body photons (chest dosimeter) must be authorized by CASEC/IRD/CNEN, which are responsible for calibrating, reading and interpreting the results obtained through individual monitoring devices and measurements of radioactivity in the body human or in biological samples for dose assessment. The data sent to the IRD by the SMIE is stored in a database with a web interface called External Occupational Dose Management, where it is stored for up to five years.

Keywords: External individual dosimetry, professional education, CASEC.

INTRODUCTION

All workers occupationally exposed to ionizing radiation (IOE) are required to be individually monitored, on a monthly basis, by External Individual Monitoring Services (SMIE), authorized by the Institute of Radioprotection and Dosimetry (IRD) of the National Nuclear Energy Commission (CNEN), [1].

GOAL

The objective of this work was to address the certification process of services offered by external individual dosimetry laboratories in Brazil with the Testing and Calibration Services Assessment Committee (CASEC) linked to CNEN's IRD, as well as associated details, with a view to professional education to understand the flow for students and schools.

METHODOLOGY

A bibliographic search was carried out for scientific articles, in addition to the respective online open registration data platforms belonging to IRD and CNEN. Subsequently, a technical visit was carried out to the aforementioned Institute, to better understand the theory through practice.

RESULTS

The license to operate a SMIE must be issued by the IRD, in a system established by the Directorate of Radioprotection and Nuclear Safety (DRS/CNEN) [2]. The IRD sector responsible for the process and systematic certification and/or accreditation of SMIE in Brazil is the Testing and Calibration Services Assessment Committee (CASEC) [3]. This committee was created in 2005 by encompassing the activities previously carried out by the CASMIE (Individual Monitoring Services Assessment Committee) and CALCRI (Ionizing Radiation Calibration Laboratory Assessment Committee) committees [3]. He has the official

powers to evaluate the Testing and Calibration Services Certification request processes in accordance with the adopted criteria, with a view to granting certification; monitor, through audits and monitoring and/or intercomparison programs, the performance of certified Testing and Calibration Services; evaluate requests for maintenance or extension of the granting of Testing and Calibration Services Certification; and recommend to the IRD Management the granting, renewal, suspension or cancellation of the Testing and Calibration Services Certification, presenting evidence that justifies the recommendation [2].

Obtaining this certification consists of analyzing documentation delivered by SMIE to CASEC, which includes everything from general and administrative aspects to technical aspects such as the results of dosimetric system performance tests. After approval of the documentation, those responsible must pass a qualification exam and the SMIE is subject to the External Individual Monitoring Service Performance Assessment Test, by the IRD National Ionizing Radiation Metrology Laboratory (LNMRI/IRD), which aims to verify the metrological reliability of individual monitoring systems for the body on external exposure to X and gamma radiation fields. The system for certification of SMIEs established by CASEC covers the legal constitution of SMIEs, quality assurance, qualification of personnel and human resources, facilities, documentation, dose recording and technical aspects (calibration, dosimetric system, performance test, among others). This test aims to verify the metrological reliability of individual monitoring systems, used to monitor the entire body in external exposure to X and gamma radiation fields [4,5].

The certification provided by CASEC is valid for three years and during this period, the SMIE is submitted to the CASEC/IRD Monitoring Program to maintain certification

and is subject to audits to renew certification [2]. This Program's main objective is to evaluate the SMIE's measurement capacity and response time (time elapsed between the return of the dosimeters by the IRD and the sending of the report by the SMIEs in exactly thirty days). To this end, each SMIE sends five dosimeters per month to CASEC, four of which are irradiated at the LNMRI (National Laboratory of Ionizing Radiation Metrology), with well-established doses and conditions [2]. Then, the dosimeters are sent for reading to the SMIE, which, in turn, evaluates the individual doses on the monitors and sends the results to CASEC in the form of a report [6].

The Audit Process is based on the assessment of staff training and competence, maintenance and calibration of equipment; on the performance of the individual monitoring system through the reading of 25 dosimeters irradiated at LNMRI with well-established doses and conditions; and in the history of a group of dosimeters from receipt to issuance of the dose report [7]. The data sent to the IRD by the SMIE are stored in a database, with a web interface, called External Occupational Dose Management (GDOSE) [8].

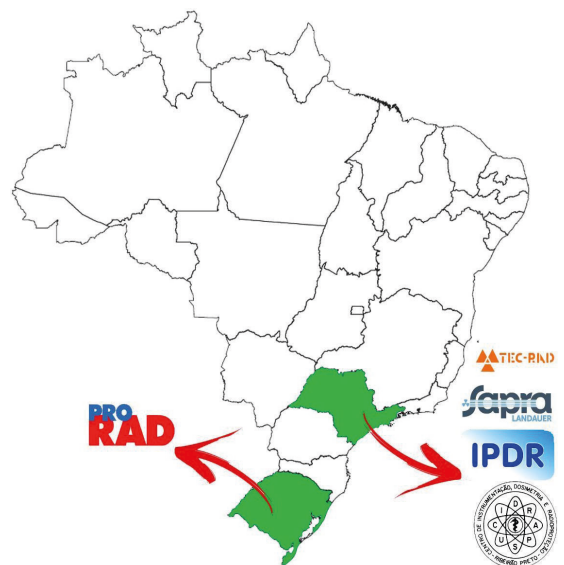


Figure 1: Diagram of the location of external individual monitoring services licensed by the National Nuclear Energy Commission.



Figure 2: Chronology of foundation of existing external dosimetry laboratories in Brazil certified by CASEC/IRD/CNEN.

CONCLUSIONS

According to research on information contained on CNEN and IRD online platforms, in Brazil, all SIMIE for whole body photons (chest dosimeter) must be authorized by CASEC/IRD/CNEN. They are responsible for calibrating, reading and interpreting the results obtained through individual monitoring devices and measurements of radioactivity

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in the human body or in biological samples to evaluate doses. The data sent to the IRD by the SMIE is stored in a database with a web interface called External Occupational Dose Management, where it is stored for up to five years. According to information contained in the CNEN access to information (last accessed on May 18, 2018), there are five registered and certified individual monitoring laboratories. All laboratories are certified by CASEC to provide SMIE, and all services use traditional thermoluminescent dosimetry (TL), generally with detectors based on lithium fluoride (LiF) and recently, one of these services (Sapra Landauer) was certified to provide external individual monitoring with optically stimulated dosimetry (OSL), using dosimeters based on aluminum oxide (Al₂O₃:C) detectors, thus being the first laboratory authorized to use this dosimetric technique commercially in the country.