



## **INTERCOMPARISON EXERCISE OF REPROLAM 2023 (IDIREPROLAM2023) IN EVALUATION OF OCCUPATIONAL INTERNAL DOSE**

The Network for the Optimization of Occupational Radiological Protection of Latin America and the Caribbean (REPROLAM), with the support of the International Atomic Energy Agency (IAEA), in order to contribute to improving the technical development of dosimetry services and the harmonization of protocols for the same for the region, on this occasion it is pleased to announce the Intercomparison Exercise for the Evaluation of Occupational Internal Dose 2023 (IDIREprolam2023).

The coordination of the Internal Dosimetry Thematic Area will be in charge of this exercise and it will be carried out this time with the support of the IAEA RLA 9091 technical cooperation project, currently underway. This intercomparison will be open to the participation of public and private entities.

### **Scope**

The scope of this intercomparison is to verify the response capacity in the evaluation of compromised effective dose due to internal exposure scenarios with radionuclides, applying the new biokinetic and dosimetric models published in the ICRP OIR series, satisfying the current criteria for the evaluation of internal exposure established in the IAEA Safety Standard: General Safety Requirements, Part 3: "Radiation Protection and Safety of Radiation Sources" and in the General Safety Guide GSG-7: "Occupational Radiation Protection", available in Spanish on the IAEA website:

<https://www.iaea.org/es/publications/10812/proteccion-radiologica-y-seguridad-de-las-fuentes-de-radiacion-normas-basicas-internacionales-de-seguridad>

<https://www.iaea.org/es/publications/13573/proteccion-radiologica-ocupacional>

In this context, the results obtained may be considered by the internal dosimetry services/laboratories/groups to prove their technical competence in the evaluation of occupational internal dose, identify opportunities for improvement and demonstrate compliance with the review requirement of their management system. , necessary to comply with regulatory requirements related to the approval or authorization of the service by the regulatory bodies of each country for individual occupational control.

## Participants

The call for this exercise is aimed at services, laboratories, groups or end users that carry out internal occupational dose assessments, for the calculation of committed effective dose, both from public and private entities.

**Costs and Billing:** The participation fee in the intercomparison is 500 euros (five hundred euros) for each SDI. A refund may only be requested in the event that the intercomparison is canceled by REPROLAM.

## PROPOSED SCHEDULE:

- Announcement – call for participants May 2023
- Registration of participants: May – June 2023
- Deadline for registration: June 15, 2023
- Sending of the protocol: June 16, 2023
- Sending the results to the Coordinator June-August 2023
- Deadline for sending results obtained: August 15, 2023
- Discussion of Results October 2023
- Final Report: March 2024
- Issuance of Certificates of participation April 2024



The main objective of this intercomparison is to verify the response capacity in the evaluation of compromised effective dose due to internal exposure scenarios with radionuclides of interest in the occupational area, applying the new biokinetic and dosimetric models published in the ICRP OIR series.

We invite public and private entities to participate and register, more information on our website and by email [IDreprolam2023@gmail.com](mailto:IDreprolam2023@gmail.com)

Registration can be done at the link: <https://forms.gle/TP2kSFtDxsDVPsLN8>

Additional Information: [www.reprolam.com](http://www.reprolam.com)

Registration form: <https://forms.gle/TP2kSFtDxsDVPsLN8>



## INTERCOMPARISON OF REPROLAM 2023 FOR EXTERNAL DOSIMETRY SERVICES OF LENS AND EXTREMITIES (ICREPROLAM2023EXT&CRI)

One of the objectives of the Network for the Optimization of Occupational Radiological Protection of Latin America and the Caribbean (REPROLAM) is to develop intercomparisons to contribute to the improvement of technical support services for occupational radiological protection. In the next few days, the intercomparison for external dosimetry services for whole body dosimeters (ICReproLAM2022) will conclude, where the magnitudes  $H_p(10)$  and  $H_p(0.07)$  were evaluated.

The accelerated development of Diagnostic Imaging has contributed to the increased use of interventional radiology (IR) and interventional cardiology (IC) techniques. However, these interventional procedures generally require long fluoroscopy times that deliver high doses to the occupationally exposed worker (TOE), especially to the worker's hands and lens. In the case of exposure of the lens, as a result of epidemiological studies in workers in the medical sector, the appearance of cataracts has been demonstrated for doses lower than 0.5 Gy and consequently it has been recommended by the ICRP to reduce the dose limit for TOE. from a value of 150 mSv/year to 20 mSv/year (on average over 5 years, and never more than 50 mSv in one year). For this reason, in recent years, the competent international organizations (ISO, ICRP, IAEA) have devoted special attention to extremity and lens dosimetry, including updating metrological and measurement aspects. Our region is no stranger to this problem and it has been possible to verify an increase in the number of TOE exposed and therefore the need for dosimetry services that are capable of guaranteeing the surveillance of the exposures received.

In order to contribute to the efforts made by external dosimetry services in the region, **REPROLAM** announces its second Intercomparison Exercise for External Dosimetry Services for extremity and lens dosimetry (ICReproLAM2023ext&cri).

The intercomparison will be carried out with the support of the Ionizing Radiation Metrology Laboratory of the Nuclear Energy Department of the Federal University of Pernambuco (LMRIDEN/UFPE) of Brazil and the IAEA-RLA 9091 technical cooperation project. They will be able to participate in the Intercomparison laboratories and/or dosimetry services of public and private institutions.

**Scope:**

The intercomparison will cover extremity and lens dosimeters intended for the evaluation of the magnitudes  $H_p(0.07)$  and  $H_p(3)$ , respectively.

Notes:

- Dosimeters of extremities, ring type, or wrist used for the measurement of  $H_p(0.07)$
- Lens dosimeters designed to be placed on the head, close to the eyes, for the measurement of  $H_p(3)$ .

The irradiations will be carried out at the LMRI-DEN/UFPE in Brazil using photons and the following ranges of values:

crystalline limbs	
<b>Energy (keV):</b>	<b>30 a 1250</b>
<b>Dose (mSv):</b>	<b>0.2 a 50</b>
<b>Angle:</b>	<b>0° y ± 60°</b>

**Note:** The irradiations will be carried out using the ISO simulators:

- Ring: 19mm PMMA barrel (ISO PMMA rod)
- Crystalline: PMMA cylinder of 20 cm (diameter and height), filled with water (Head phantom)

**Participation registration:** External Dosimetry Services (SDE) that wish to participate in this Intercomparison must complete the registration form that can be accessed using this address: <https://forms.gle/LpRpxjrMPyASpkEg8> or through the REPROLAM website.

**Costs and Billing:** The participation fee in the intercomparison is:

- 1000 euros (one thousand euros) for each SDE by type of dosimetry (ring or lens)
- 1500 euros (one thousand and five hundred) for participation in intercomparison of lens and extremities

The registration fee must be transferred to REPROLAM's bank account (which appears reflected in the Invoice sent by REPROLAM in the confirmation of acceptance), within a maximum period of 30 days after receipt of the invoice.

The costs associated with banking operations will be assumed by the participant.

***The IAEA will sponsor the participation of a single public laboratory per country, for a total of 18 (eighteen) laboratories in the region.***

## PROPOSED SCHEDULE

- Announcement – call for participants May 2023
- Registration of participants: May – June 2023
- Registration deadline: June 30, 2023
- Deadline for sending dosimeters to the LMRI-DEN/UFPE: June 30, 2023
- Irradiations: July - August 2023
- Return of the dosimeters to the SDE for reading: September 2023
- Deadline for sending results obtained: October 31, 2023
- Final results information: November 2023
- Issuance of Certificates of Participation November 2023

For more information visit: [www.reprolam.com](http://www.reprolam.com)

Contact: [icreprolam@gmail.com](mailto:icreprolam@gmail.com)



CULTURA DE SEGURIDAD

## SAFETY FIRST

*Space dedicated to common understanding and the promotion of Safety Culture through information, analysis, dissemination of experiences and related news.*

### DOES MY ORGANIZATION CONTINUALLY LEARN FROM SAFETY EXPERIENCES?

Are you and your colleagues aware of the radiological accidents that have been reported in Latin America? And those of physical safety of sources? Have these accidents been discussed in your organization to find out what lessons they teach and assess whether there are issues to improve in practices or facilities to prevent something similar from happening? Does your organization know how it is in terms of safety and radiation protection or physical security of sources in comparison with other organizations in the same sector, locally and internationally? Is your organization aware of new trends, advances and best practices in the field of safety? These are some of the questions that an organization constantly asks when there is a solid safety culture. It is one of its distinctive features:

**continuous organizational learning about safety**



In order to foster and develop a culture of learning, the organization must be convinced of its usefulness and create mechanisms and procedures that allow it to search, identify, analyze, learn and disseminate the lessons derived from any radiological event or incident or loss of control. on sources, internally or externally, as well as recognized good practices. This includes not only learning from what is happening, but periodic self-examination of the basic values and assumptions that govern the organization's behavior and operation with respect to safety, with a view to identifying vulnerabilities and resolving them.

Another important source of organizational learning comes from the exchange of the organization with the so-called interested parties. Knowing the concerns of clients, the fears and complaints of patients, the doubts of the communities close to a nuclear or radioactive facility and its systematic analysis, encourage the organization to reflect and seek improvements in terms of communication, transparency in information and their own image, resulting in new learning.



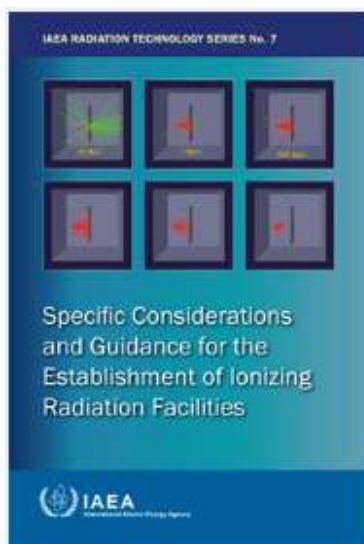
The learning culture needs the organization's capacity for change, that is, a flexible culture that allows it to be reconfigured whenever necessary as a result of organizational learning. When there is a strong safety culture, the organization understands that organizational learning does not end with the collection and analysis of information regarding lessons learned from events or other aspects of safety concern. It should be noted that real learning is evidenced when the organization introduces the reforms or changes that are required, both locally and throughout the organization, demonstrating its willingness and competence to draw and implement the correct conclusions and to improve.

**If you are a manager or work promoting the Safety Culture, remember that the culture of learning is a path towards the search for excellence in safety.**

[1] IAEA. COLLECTION OF IAEA TECHNICAL DOCUMENTS. TECDOC1995 Safety culture in organizations, facilities and activities related to the use of ionizing radiation sources, Vienna, 2022

Ruben Ferro - Regan Ramirez

## SPECIFIC CONSIDERATIONS AND GUIDANCE FOR THE ESTABLISHMENT OF IONIZING RADIATION FACILITIES



### Description

Various nuclear techniques have led to opportunities to enhance quality of life through services offered by ionizing radiation facilities (IRFs). National nuclear institutions, universities, medical centres, and private companies have established and used IRFs not only for research and development purposes but also for the provision of commercial services and goods. This publication provides guidance for organizations and institutions working on IRF projects to enable them to undertake them in a well-organized manner. It includes considerations for a feasibility study, provides detailed methodologies on how to assess the status of the necessary infrastructure, and aims to help Member States as well as their respective organizations to understand their commitments and obligations associated with an IRF project. It is intended to be used by managers, staff, decision makers at the national level and other stakeholders at institutions that are seeking or supporting the establishment of an IRF.

Available in:

<https://www.iaea.org/publications/15097/specific-considerations-and-guidance-for-the-establishment-of-ionizing-radiation-facilities>

## ARTICLE: "IODINE DETERMINATION IN POPULATION INTERNALLY EXPOSED TO IONIZING RADIATION"

Author: Begoña Pérez López, CIEMAT, Madrid.

In a nuclear or radiological emergency, which can occur at nuclear facilities or radiopharmaceutical production centres and hospitals, different radioisotopes are emitted into the atmosphere and these are displaced through the air contamination plume through different territories over time. They can intake into the body through inhalation, ingestion of contaminated food, and through the skin, by wounds or by injection.

Whether the contamination produced are radioiodines, these are very volatile and are quickly incorporated into the bloodstream where they are distributed throughout the body, with the tendency to keep retained in the thyroid gland, where they will remain until they decay or come back to blood and are excreted.

The existence of *in vivo* techniques for the determination of I-131 in occupationally exposed workers is developed for the evaluation of effective dose committed to 50 years in this population group. The truth is that, in the event of a radiological and nuclear emergency where the population is exposed to internal exposure, it is advisable to improve the preparation to radiological surveillance to other population groups, such as children.

After the Fukushima accident (2011), several laboratories have developed neck-thyroid phantoms for children of different ages that allow more realistic calibrations of detection equipment and therefore more reliably determination of I-131 activity retained in the thyroid and improving the evaluation of effective dose committed to 70 years.



Figure 1 . Thyroid-neck phantoms for adults and children of 15, 10, 5 and 1 years old developed at CIEMAT.



The equipment used to monitor iodine in thyroid for internally exposed people can be portable radiation contamination monitors, scintillation sodium iodide (NaI) detectors, semiconductor germanium detectors, gamma cameras (NaI detectors),... All of them have a special function when there is a requirement to assess doses due to the incorporation of iodine in a large amount of population, namely: portable contamination monitors allow a first screening and discern which people are contaminated or not; in the case of contamination, the iodine activity retained in the organism can be determined with NaI detector when the contamination is simple, such as I-131 contamination, or with germanium detector, which is characteristic of being very resolving and allows the determination of complex contaminations, that is, various isotopes of iodine or with gamma emissions or low energy X-rays.



Figure 2 . Thyroid iodine monitoring.

Calibrations of the equipment with phantoms of different ages implies an improvement in the quantification of the activity and therefore the evaluation of the committed effective dose at 70 years of age for children is more realistic. This work is a great advance in the preparation of the WBC for surveillance of children population of 1 year, 5, 10 and 15 years and adult women.

The collaboration between Whole Body Counter laboratories of the different Latin American countries, the Caribbean and Spain would mean an improvement in radiological surveillance in the population in a radiological and nuclear emergency.

References:

*Methodology at CIEMAT whole body counter for in vivo monitoring of radioiodine in the thyroid of exposed population in case of nuclear emergency.* B. Pérez López, J.F. Navarro, M.A. López. *Radiation Protection Dosimetry*.  
<https://doi.org/10.1093/rpd/ncy045>

## NEWS: ROLF M.SIEVERT AWARD

The International Radiation Protection Association (IRPA) has consecrated Dr. María del Rosario Pérez as the winner of the Rolf M. Sievert Award.

The Sievert Award is the most important international distinction in radiological protection, and is awarded every four years to a professional as the highest recognition of their career. The Sievert Award will be formally awarded during the Opening Ceremony of the next IRPA International Congress (IRPA16) that will take place in July 2024 in Orlando, Florida-USA, where Dr. Pérez will give the Sievert Lecture.

With this Award, Argentina is the only country whose specialists can be said to have received it three times: Dan Beninson (1996), Abel González (2004) and now María del Rosario Pérez. She is also the first woman to be awarded the Sievert Prize.

Our congratulations to her!!



Dra. María del Rosario Pérez

*Dr. María del Rosario Pérez is a medical specialist in Radiotherapy, with postgraduate training in Epidemiology and Radiological Protection and Nuclear Safety.*

*During the last 25 years his professional activity has been related to radiological protection and human health. She coordinated the Radiopathology Laboratory of the Argentine Nuclear Regulatory Authority, was secretary of the Advisory Council on Radioisotopes and Ionizing Radiation Applications, and was responsible for the national liaison center of the Radiological Emergency Medical Preparedness and Response Network (REMPAN) of the World Organization of Health (WHO), Argentina's alternate representative to the United Nations Committee on Radiation Effects (UNSCEAR) and UNSCEAR consultant on radiation effects on the immune system. In Latin America, it contributed to the implementation of radiation protection education and training programs and promoted regional cooperation for preparation and response in radiological emergencies.*

## **CCRI WEBINAR ON 'RADON METROLOGY: ADVANCEMENTS AND CHALLENGES IN INTERNATIONAL INDOOR AIR QUALITY ASSESSMENT'**

**23 MAY 2023 09:00 A. M. IN - ZOOM PLATFORM**

Radon isotopes are radioactive gases that decay through alpha particle emission, resulting in solid progenies that are isotopes of lead and bismuth.

These progenies can further decay through alpha or beta transitions. Since radon isotopes originate from the isotopes of uranium and thorium present in soil, they are one of the main sources of natural radioactivity and the second leading cause of lung cancer, as stated by the World Health Organization. Therefore, monitoring radon concentrations in public or private areas, especially in mines, is crucial. Consequently, maintaining good metrological traceability of radon and its progenies is essential for calibrating commercial radon detectors and accurately studying their properties.

In this webinar, we will provide an overview of the current status of radon metrology, focusing on the standards developed by various national metrology institutes and other aspects related to radon metrology.

Registration is open at

<https://us06web.zoom.us/meeting/register/tZwkcu6hqzorHNTrnv7gFhZhMoPUTV7Xw2fW>

The Network for the Optimization of Occupational Radiological Protection in Latin America and the Caribbean (REPROLAM) is a scientific and cultural society, non-profit, political, religious or racial, of unlimited duration, whose objective is to promote the optimization of occupational radiological protection. REPROLAM seeks to expand academic and scientific cooperation among its members, with the aim of promoting adequate radiological protection for workers.

Visit our website for more information: <http://www.reprolam.com/>

How to contact: [reprolam2020@gmail.com](mailto:reprolam2020@gmail.com)