THE INFORMATION SYSTEM ON OCCUPATIONAL EXPOSURE IN MEDICINE, INDUSTRY AND RESEARCH: INDUSTRIAL RADIOGRAPHY

2024 Annual Report

INTERNATIONAL ATOMIC ENERGY AGENCY
Vienna, 2025

FOREWORD

The International Atomic Energy Agency is the world's central intergovernmental forum for scientific and technical co-operation in the nuclear field. It works for the safe, secure, and peaceful uses of nuclear science and technology, contributing to international peace and security and the United Nations' Sustainable Development Goals.

ISEMIR is the acronym for the Information System on Occupational Exposure in Medicine, Industry and Research. Optimization of protection is one of the three general principles of radiation protection. ISEMIR-IR is a tool for radiation protection optimization for non-destructive testing (NDT) companies, conducting industrial radiography (IR). ISEMIR-IR is developed as a web-based tool for regular data collection and analysis of occupational doses for individuals in IR, and for the use of this information to improve occupational radiation protection. It assists IR facilities in benchmarking their arrangements in radiation protection and safety, and hence it promotes the implementation and optimization of occupational radiation protection.

In 2024, the IAEA General Conference Resolutions GC (68)/RES/8, of the IAEA General Conference, which called on the Secretariat to promote the ISEMIR and to assist Member States, upon request, to strengthen the radiation protection of workers subjected to exposure [1]. The resolution also recommends that Member States provide data on occupational exposure to the ISEMIR programme. In previous similar resolutions, GC (63)/RES/7, GC (64)/RES/9 and GC (66)/RES/6 [2-4], the IAEA has launched ISEMIR-IR global surveys in 2010, 2020 and 2022 aimed to improve the ISEMIR-IR system and to meet the needs of users, such as NDT service providers.

In response to the GC resolutions, the implementation of ISEMIR-IR activities continued in the year 2024 and included publication and distribution of 2023 ISEMIR-IR annual report to relevant stakeholders and Fourth ISEMIR-IR global survey was launched in September 2024. Other activities were on the management and upgrading of ISEMIR-IR system, review and preparation of ISEMIR-IR related documents and the provision of support to participate in international meetings.

The current report contains the summary of activities performed in the year 2024, and the current status of the database collections. The ISEMIR-IR system continues to provide a worldwide benchmarking platform in the promotion of optimization of protection. Promotional efforts are ongoing to increase the number of active users of ISEMIR-IR system. The cooperation and contribution of NDT service providers and regulatory bodies, in supporting the IAEA in ISEMIR-IR activities is highly appreciated.

CONTENTS

1 INTRODUCTION

The ISEMIR project was initiated by the IAEA in January 2009 to focus on very specific topical areas where occupational radiation protection needs to address non-trivial occupational exposures and may face unresolved issues and gaps.

In the design phase, the IAEA was assisted by an Advisory Group (AG) with representatives of international organizations as well as from the five main world regions. The AG identified two specific areas in radiation use, where non-trivial occupational exposures occur, interventional cardiology and industrial radiography (IR).

For each of these two specific topical areas, a working group was set up with experts covering the area in a comprehensive way, with respect to professions, type of radiation usages, geographical regions, and other factors. The Working Group on Industrial Radiography (WGIR) was formed.

The main task of the WGIR was to draw an overview of the situation concerning occupational exposures and radiation protection of staff in IR worldwide. The WGIR was comprised of professionals with experience of working for NDT companies, client companies, NDT societies, technical service organizations, including education, training, and inspection, as well as for regulatory bodies. The WGIR and the AG agreed that the effort for WGIR should be focussed on keeping both the dose due to normal exposure and the risk of accidents as low as reasonably achievable (ALARA).

As a part of its actions, the WGIR performed a worldwide survey of occupational radiation protection in IR over a period of about one year, from mid-2010 to mid-2011. Responses were received from 432 industrial radiographers, 95 NDT companies, and 59 regulatory bodies. The data collected demonstrated:

- a clear need for worldwide improved optimization of occupational radiation protection in IR

- an ability to compare doses for specific occupational roles and conditions, to assess the impact of radiation protection actions, and to track dose trends.

The results of the survey, including its comprehensive analysis, have been included in the TECDOC: The Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR): Industrial Radiography (IAEA-TECDOC-1747) [5].

The AG and the WGIR in its original set-up ceased to exist. ISEMIR-IR continued with the support of experts. The experts meet every year in consultancy meetings (CS) that are organized by the IAEA.

In 2020 and 2022, the CS meeting performed the second and the third ISEMIR-IR global surveys. The details of the results of previous surveys can be found in the published reports at https://www.iaea.org/topics/information-system-on-occupational-exposure-in-medicine-industry-and-research-industrial-radiography [6,7]. The summary of the activities carried out in 2024, and the status of the database collections are presented in this report, which is accompanied by concluding remarks.

2 STATUS OF THE ISEMIR -IR SYSTEM

2.1 USER REGISTRATION

In 2024, 6 new users registered in the ISEMIR-IR system, and the number of users has reached 52. Figure 1 provides an overview of total number of registrations in the ISEMIR-IR system at the end of year.

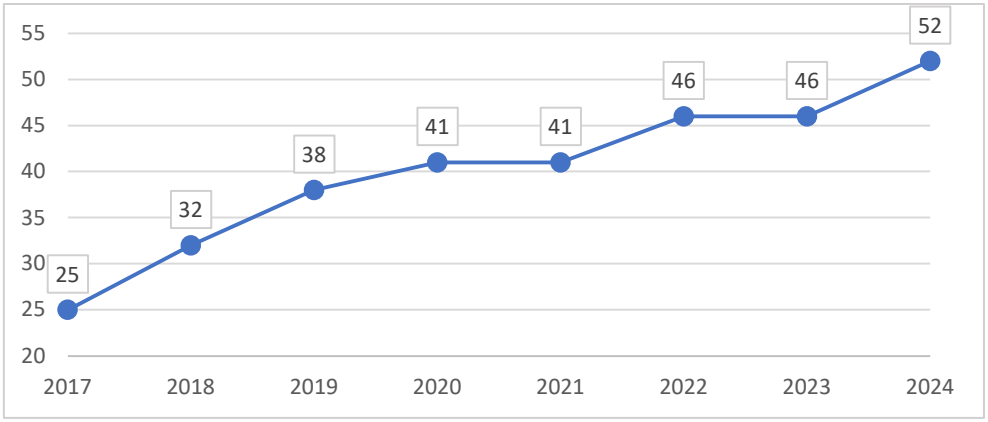
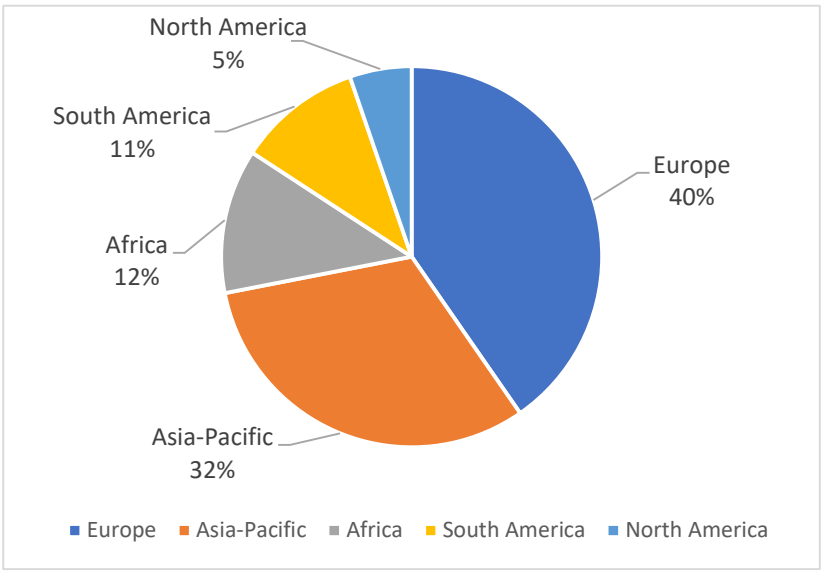


Figure 1 Trend of Total registrations (Year-End)

2.2 COMPANY REGISTRATION

In 2024, 6 new companies registered in the ISEMIR-IR system. Additionally, as part of the



ISEMIR-IR system upgrade, the dataset of the third Global Survey was added, so that companies from 57 countries across Europe, Asia-Pacific, North America, South America, and Africa currently are currently registered in the system.

Figure 2 Regional Distribution of Countries with Registered NDT Companies

2.3 DATA STATISTICS

There are currently 11 datasets registered in the system that have already been published. On the other hand, there are 511 datasets with the status "in progress", as some need to be validated by users after one-time data upload in 2024 or some data is incomplete and missing. The IAEA encourages companies not only to register the required information to publish their datasets, but also to submit datasets for the new year in or around April.

3 ACTIVITIES CONDUCTED IN 2024

3.1 PUBLICATION OF ISEMIR-IR ANNUAL REPORT 2023

The preparation of the ISEMIR-IR Annual Report 2023 has been completed and published. The report is available at https://www.iaea.org/topics/information-system-on-occupational-exposure-in-medicine-industry-and-research-industrial-radiography.
The report was distributed to the national contact persons (NCPs), the third ISEMIR-IR survey participants/NDT companies and the users registered in ISEMIR-IR. The sources for the e-mail addresses were the list of NCPs, the ISEMIR-IR platform, Survey Monkey, and the list of contact persons for the third global ISEMIR-IR global survey.

3.2 CONSULTANCY MEETING

The ISEMIR-IR consultancy meeting took place from April 2 to 4, 2024 at the IAEA headquarters in Vienna, Austria. Six experts from Brazil, Canada, China, Morocco, the Netherlands and the United Kingdom participated in the meeting. The aim of the meeting was to provide an overview of ISEMIR-IR activities in 2023, propose the work plan for ISEMIR-IR in 2024, and discuss the upgrading of the ISEMIR-IR system. The participants of the meeting discussed the operation mechanism of the ISEMIR-IR system, such as the process of new user registration, data collection by users, the process of data submission, and the process of data validation and publication. Some improvements and promotional activities were suggested, including holding a webinar for NDT companies prior to the fourth global survey, in order to promote the survey and clarify any questions.

3.3 ACTION LIST

One of the key outputs of the consultancy meeting was the improvement of the ISEMIR-IR activities, including a reminder on the appointment of NCPs. Additionally, the methodology of the fourth ISEMIR-IR global survey was also discussed. These were summarized in the action list, which has an important guiding function for the work of the consultancy meeting experts. At each subsequent consultancy meeting, the action list is reviewed and updated with completed, ongoing and new actions.

3.4 ISEMIR-IR SYSTEM

E-mail reminders were sent to all registered users in July 2024, to request for their annual submissions of data for 2023. The phase 1 upgrade has been completed (see section 3.7).

3.5 NATIONAL CONTACT PERSONS

The NCPs have been designated by the National Liaison Officers (NLOs) and the regulatory bodies to support the promotion of ISEMIR-IR. The total number of NCPs for industrial radiography in December 2024 is 49, which represents an increase of 17 compared with 2023. The regional distribution of ISEMIR-IR NCPs is summarized in Table 1.

TABLE 1. COUNTRIES THAT NOMINATED NATIONAL CONTACT PERSONS

Region	**Country**	**Number of NCPs - IR**
Africa	Kingdom of Eswatini, Mauritius, Egypt, Tanzania, Nigeria, Morocco, Kenya, Gabon, Niger, Mozambique, Sudan, Chad, Mali	13
Asia-Pacific	Bangladesh, Thailand, Malaysia, China, Japan, Iraq, India	7
Latin America and the Caribbean	Uruguay, Antigua and Barbuda, Argentina,	3
Europe	Greece, Latvia, Portugal*, Macedonia, Lithuania, Czech Republic, Romania, Turkey, Bulgaria, Cyprus, Armenia, Moldova*, Slovakia, Iceland, Switzerland, Finland, Malta, Ireland, Italy, Poland, Spain*, Belgium, Sweden	26
Total		49

1) The underlined countries have nominated ISEMIR-IR NCPs in 2024.
2) The countries marked with * have nominated two ISEMIR-IR NCPs.

3.6 PROMOTION ACTIVITIES OF THE EXPERT WORKING GROUP

The Agency was represented by one expert to present the activities of ISEMIR-IR at the World Conference on Non-Destructive Testing (WCNDT) in Seoul, South Korea, from May 27 to 31, 2024.
Another expert presented the activities of ISEMIR-IR at the REPROLAM SYMPOSIUM in Recife, Brazil, from November 5 to 8, 2024.
The ISEMIR-IR system was also promoted at more than 15 IAEA meetings and missions.
To facilitate access to the ISEMIR system, the testing of Phase 1 upgrade was completed in May 2024.
Due to the importance of the ISEMIR system to the IAEA Member States, a call for the use of the system was included in the 2024 IAEA General Conference Resolution (GC (68)/RES/8) [1] and also contributed to promotional activities,

3.7 UPGRADING OF ISEMIR-IR SYSTEM

The project proposal for Phase 1 of the ISEMIR-IR update was submitted to the Information Technology Advisory Group (ITAG) of the IAEA on October 23, 2023, and approved on October 31, 2023. This phase included the translation into multiple languages, starting with six United Nations languages. In addition, the questions have been e revised, the number of mandatory questions reduced, one-time ISEMIR-IR data uploaded, and the operational mechanisms improved. Phase 1 was completed in May 2024. Subject to the availability of funding, Phase 2 will follow, which will include these tasks.

- Enhance the core technology of the current web application;
- Interface design review;
- Modernize the user interface (UI) for responsiveness and an updated appearance;
- Streamline the system architecture to improve maintainability and scalability;
- Conduct a comprehensive security review and address any identified vulnerabilities; and
- Improve and add new periodic dose analysis features.

4 ISEMIR-IR GLOBAL SURVEY

During the CS meeting from 2-4 April 2024, a global survey on ISEMIR-IR was proposed and two questionnaires for regulatory bodies and NDT service providers respectively were produced at this meeting. At this meeting it was discussed and agreed to use a methodology similar to the 2022 survey, i.e. online questionnaires via Survey Monkey in addition to hardcopies sent by email.

Conducting the fourth Global Survey through a combination of online and offline methods aimed to increase the number of NDT companies and regulatory bodies, and facilitate analysis in the case of Survey Monkey responses. The questionnaire for the regulatory bodies comprised 9 main questions and was written in English. The questionnaire for NDT service providers comprised 19 main questions and was written in 12 languages (Chinese, Czech, English, French, German, Japanese, Korean, Portuguese, Russian, Slovak, Spanish, and Turkish).

The global survey was launched by the IAEA in October 2024. The questionnaires were distributed widely primarily using IAEA contacts with regulatory bodies, the NCPs, and the registered users in the ISEMIR-IR system. The deadline for submitting the questionnaires was 31 December 2024 but was extended to 11 July 2025.

By the deadline of 11 July 2025, 37 responses from regulatory bodies in 37 countries and 250 responses from NDT service providers in 36 countries were received. The regions from which the responses of regulatory bodies and NDT service providers originated, are listed separately in Table 2 and Table 3.

TABLE 2. NUMBER OF QUESTIONNAIRES RECEIVED FROM REGULATORY BODIES

Region	Questionnaires received	Countries
Africa	9	9
Asia-Pacific	4	4
America	8	8
Europe	16	16
Global	37	37

TABLE 3. NUMBER OF QUESTIONNAIRES RECEIVED FROM NDT SERVICE PROVIDERS

Region	Questionnaires received	Countries
Africa	23	10
Asia-Pacific	153	7
America	3	2
Europe	71	17
Global	250	36

5 CONCLUSION

ISEMIR-IR is a free online tool that was developed with the support of a group of experts who also provide guidance for its use. The aim of the tool is to help NDT companies optimize radiation protection in the workplace and improve their safety culture. ISEMIR-IR has been upgraded to make the system more user-friendly, while retaining the periodic dose analysis features. The IAEA ISEMIR-IR team welcomes comments, suggestions and support from NDT companies and other users of this tool to meet their needs.

The Agency respects the privacy of NDT companies. Therefore, ISEMIR-IR has been designed as a system with a high level of data security. Only registered users have access to the data. The anonymized statistics for benchmarking purposes are only available to NDT companies that have uploaded at least one data set.

In the meantime, promotional efforts are being made to increase the number of active users of the ISEMIR-IR system. The cooperation and contribution of regulatory bodies, NDT service providers and NDT facilities workers in these efforts is also greatly appreciated.

6 REFERENCES

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Sixty-eighth regular session IAEA General Conference Resolution GC (68)/RES/8, IAEA, Vienna (2024)

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Sixty-sixth regular session IAEA General Conference Resolution GC (66)/RES/6, IAEA, Vienna (2022)

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Sixty-fourth regular session IAEA General Conference Resolution GC (64)/RES/9, IAEA, Vienna (2020)

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Sixty-third regular session IAEA General Conference Resolution GC (63)/RES/7, IAEA, Vienna (2019)

[5] INTERNATIONAL ATOMIC ENERGY AGENCY, The Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR): Industrial Radiography, IAEA TECDOC Series No. 1747, URL: https://www-pub.iaea.org/MTCD/Publications/PDF/TE-1747_web.pdf, IAEA, Vienna (2014)

[6] INTERNATIONAL ATOMIC ENERGY AGENCY, The Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR): Industrial Radiography, URL: https://nucleus.iaea.org/isemir/, IAEA, Vienna (2017)

[7] INTERNATIONAL ATOMIC ENERGY AGENCY, Report on the Global Survey on the Information System on Occupational Exposure in Medicine, Industry and Research – Industrial Radiography (ISEMIR-IR), IAEA, Vienna (2023) (Available at: https://www.iaea.org/topics/information-system-on-occupational-exposure-in-medicine-industry-and-research-industrial-radiography)