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

2023 Annual Report

INTERNATIONAL ATOMIC ENERGY AGENCY
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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 2023, the IAEA General Conference Resolutions GC (67)/RES/6, of the IAEA General Conference, which called on the Secretariat to promote the ISEMIR programme and to assist Member States, upon request, to improve the radiation protection of workers exposed to ionizing radiation in the medical, industrial and research sectors [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 year 2023 and included publication, and distribution of 2022 ISEMIR-IR global survey report and 2023 ISEMIR-IR annual report to relevant stakeholders. 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 meeting.

The current report contains the summary of activities performed in year 2023, and the actual 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 regulatory bodies and NDT service providers, in supporting the IAEA on ISEMIR-IR activities is also 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.

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 comprised 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 follow 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 an experts. The experts meet every year in consultancy meetings 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 2023 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 2023, no new company was registered on the ISEMIR-IR platform and the number of users remained at 46. The registered users come from 29 countries in Asia-Pacific, Europe, North America, South America, and Africa. Figure 1 provides an overview of the registration rate of NDT companies in the ISEMIR-IR system.

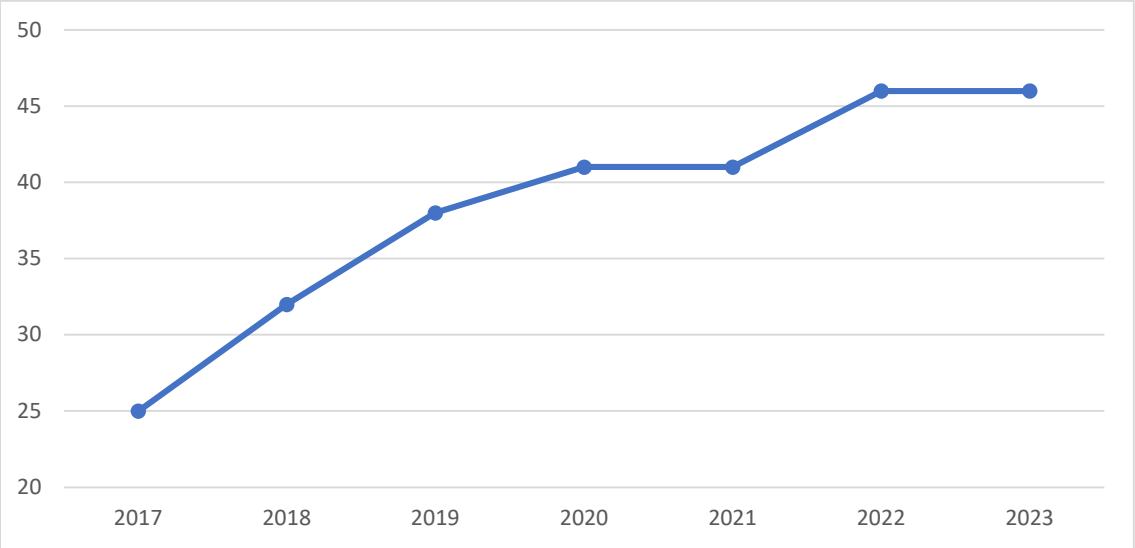

Fig. 1. Annual registration rate

2.2 DATA STATISTICS

The current number of registered NDT companies in December 2023 is 46, with 28 records in the database after 2 records were approved in 2023. The database does not contain duplicate and invalid information, which have now been removed. The companies concerned are reminded to submit their data by the end of April each year.

3 ACTIVITIES CONDUCTED IN 2023

3.1 PUBLICATION OF 2022 ISEMIR-IR GLOBAL SURVEY REPORT AND 2022 ISEMIR-IR ANNUAL REPORT

The 2022 ISEMIR-IR Global Survey Report and the 2022 ISEMIR-IR Annual Report have been finalized and published. The reports are available at https://www.iaea.org/topics/information-system-on-occupational-exposure-in-medicine-industry-and-research-industrial-radiography.

3.2 DISTRIBUTION OF ISEMIR-IR REPORTS

The 2022 ISEMIR-IR global survey report was distributed to 181 stakeholders (31 national contact persons, 81 third party ISEMIR-IR survey participants/NDT companies and 70 registered ISEMIR-IR users). The 2022 ISEMIR-IR annual report was distributed to 81 third ISEMIR-IR survey participants/NDT companies and 70 registered ISEMIR-IR users. The sources for the e-mail addresses were the list of national contact person (NCP), the ISEMIR-IR platform, Survey Monkey, and the list of contact persons for the third global ISEMIR-IR global survey.

3.3 CONSULTANCY MEETING

The ISEMIR-IR Consultancy (CS) took place from June 12 to 14, 2023 at the IAEA headquarters in Vienna, Austria. The aim of the meeting was to provide an overview of ISEMIR-IR activities in 2022, propose the work plan for ISEMIR-IR in 2023, analyse and summarize the results of the global survey on ISEMIR-IR in 2022, 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 were suggested, including revising the questionnaires, reducing the number of mandatory questions and a strategy to encourage greater participation of NDT companies through promotional activities.

3.4 ACTION LIST

One of the key outputs of the Consultancy meeting was the improvement of ISEMIR-IR processes through the revision of the global questionnaire for regulatory bodies and NDT companies. The revision reduced the number of mandatory questions. In addition, key actions that are important for the proper functioning of the database and approaches to promote the database to Member States, NDT companies and NDT operators were agreed. These were summarized in the action list, which has an important guiding function for the work of the CS experts. At each subsequent consultancy meeting, the action list is reviewed and updated with completed, ongoing and new actions.

3.5 ISEMIR-IR SYSTEM

The ISEMIR-IR platform indicates that the data upload process is not yet complete. The ISEMIR IR update will continue according to the decision taken at the 2023 Consultancy meeting (see section 3.9).

3.6 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 and interventional cardiology in December 2023 is 34, of which 31 are involved in the promotion of ISEMIR-IR. 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**
Africa	Kingdom of Eswatini, Mauritius , Egypt, Nigeria, Tanzania, Morocco	6
Asia-Pacific	Bangladesh, Thailand, Malaysia, China, Japan	5
Latin America and the Caribbean	Uruguay, Antigua and Barbuda, Argentina,	3
Europe	Greece, Latvia, Portugal, Lithuania, Macedonia, Czech Republic, Romania, Turkey, Bulgaria, Cyprus, Armenia, Moldova, Slovakia, Iceland, Switzerland, Denmark, Finland	17
Total		31

3.7 PROMOTION ACTIVITIES FROM EXPERT WORKING GROUP

One expert of the CS meeting reported on the activities of ISEMIR-IR at the British Institute of Non-Destructive Testing (BINDT) conference in Northampton, UK, from September from 12 to 14, 2023.

Another expert presented the activities of ISEMIR-IR at the conference of the European Federation for Non-Destructive Testing (EFNDT), which took place in Lisbon, Portugal, from July 3 to 7, 2023.

The third expert took part in an international symposium in Peru on November 27, 2023, with the support of the IAEA, at which the activities of ISEMIR-IR were presented.

The fourth expert held a stakeholder meeting on May 23, 2023, targeting an audience of approximately 75% of industrial radiographers in Canada.

The ISEMIR-IR system was also promoted at several IAEA meetings and missions: at the IAEA TC project regional coordination meeting on TSA2 in Tanzania in December 2023, at four ORPAS events, including a pre-mission in Thailand and Botswana, a mission in Botswana and the regional ORPAS reviewer training course in the Philippines. The ISEMIR-IR system, including the results of the global survey, was also presented at the regional radiation protection meeting in Peru in November 2023. In addition, the system was also promoted in the relevant IAEA training courses and workshops. A total of 10 promotional activities were carried out.

To facilitate access to the ISEMIR system, the proposal for Phase 1 of the upgrade of the ISEMIR-IR and ISEMIR-IC modules was approved by the IAEA IT Advisory Group (ITAG) in October 2023. The upgrade should be completed by the end of March 2024.

Due to the importance of the ISEMIR system to the IAEA Member States, a call for the use of the system is included into the 2023 IAEA General Conference Resolution (GC (67)/RES/7-79) [1]

3.8 REVISION AND PREPARATION OF ISEMIR-IR DOCUMENTS

The template letters to remind registered ISEMIR-IR users to submit data and to confirm receipt of ISEMIR-IR data were reviewed. A template for a promotional letter to be sent to potential new ISEMIR-IR users was also prepared.

3.9 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) on October 23, 2023, and approved on October 31, 2023. This phase includes translation into multiple languages, starting with six United Nations languages. In addition, the questions will be revised, the number of mandatory questions reduced, one-time ISEMIR-IR data uploaded, and operational mechanisms improved. Phase 1 is expected to be completed by the end of the first quarter of 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 adding new periodic dose analysis features.

3.10 ONE-TIME UPLOADING OF ISEMIR DATA

One hundred fifty-three ISEMIR-IR data from the third global survey submitted via Survey Monkey and those received via the ISEMIR-IR contact email were consolidated into a single spreadsheet to be uploaded into the ISEMIR-IR system. The one-time upload was chosen instead of the originally planned upload of data for a group of workers from the backend.

4 DISCUSSION

This annual report summarizes ISEMIR-IR activities in 2023 and concludes that the ISEMIR-IR system is operational. Despite the relatively small number of registered and active users, regulatory bodies, NDT companies and other stakeholders have recognized the benefits of the system. This recognition is reflected in the feedback received through the ISEMIR-IR global survey, which is usually conducted every two years. The global survey provides additional information on NDT practices and leads to a better understanding of radiation protection among NDT operators and thus to its promotion. The output of the global survey is the report, which is published on the ISEMIR-IR website and other IAEA platforms and sent to global survey participants and other NDT stakeholders. The ISEMIR-IR Annual Report has also been made available to the same institutions for feedback. In this way, the ISEMIR-IR system is promoted in parallel with other promotional activities carried out in the context of conferences, meetings, training courses or missions to Member States. In addition to these approaches, the promotion activities were carried out by the National Contact Persons designated by the Member States to provide support.

The implementation of ISEMIR-IR activities is supported by a group of experts through the action list, which is usually reviewed and regularly updated during the CS meeting. The experts also play a role in promoting ISEMIR-IR in their countries and elsewhere at conferences or meetings they attend.

At the 2023 CS meeting, the experts recognized the importance of upgrading ISEMIR-IR. In the first phase of ISEMIR-IR, five other UN languages (Arabic, Chinese, French, Spanish and Russian) were enabled in addition to English. Also in Phase 1, the ISEMIR-IR Global Survey 2022 data was uploaded to the ISEMIR-IR system to be reviewed by the relevant NDT companies. This development will increase the amount of data available to users of the ISEMIR-IR system for benchmarking purposes and therefore represents a further milestone.

During this phase, questionnaires were also revised, including the reduction of mandatory questions and the improvement of operational mechanisms. It is expected that the update will make the system more user-friendly and thus encourage many users to provide ISEMIR-IR data and benefit from its own data analysis and benchmarking capabilities to achieve optimization, which is the intended outcome of the ISEMIR-IR system. It should be kept in mind that ISEMIR-IR was designed as a system with a high level of data security, where only registered users have access to the data. In addition, the anonymized statistics for benchmarking purposes are only available to NDT companies that have uploaded at least one dataset.

Further promotional activities will raise the profile of ISEMIR-IR in the global NDT community, and this is one of the main tasks that will remain on the action list.

5 CONCLUSION

ISEMIR-IR is a free online tool that was developed with the support of a group of experts who also provide guidelines 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 is currently being 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

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