ISEMIR-IR System

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Background

- IAEA is enhancing occupational Radiation Protection through ALARA Networks e.g. ORPNET, Regional networks (such as EAN, AFAN, ARAN, REPROLAM)

- Also in the effort:
  Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR-IC, IR, N)

Background(2)

Objectives of IAEA effort

Keep radiation protection of workers optimized:

    1. the dose due to normal exposure

- if normal exposure is justified!

    2. the risk of exposure due to accidents

- (risk: combination of probability for and consequence of an accident)

ISEMIR

ISEMIR - Information System on Occupational Exposure in Medicine, Industry and Research

- A benchmark tool to improve occupational radiation protection optimization
- Online web-based information system
- 3 specific topical areas:

1.Industrial radiography ISEMIR IR

2.Interventional cardiology ISEMIR IC

3.NORM Industrial processes ISEMIR N

https://nucleus.iaea.org/isemir/

ISEMIR-IR History

ISEMIR - Information System on Occupational Exposure in Medicine, Industry and Research-Industrial Radiography
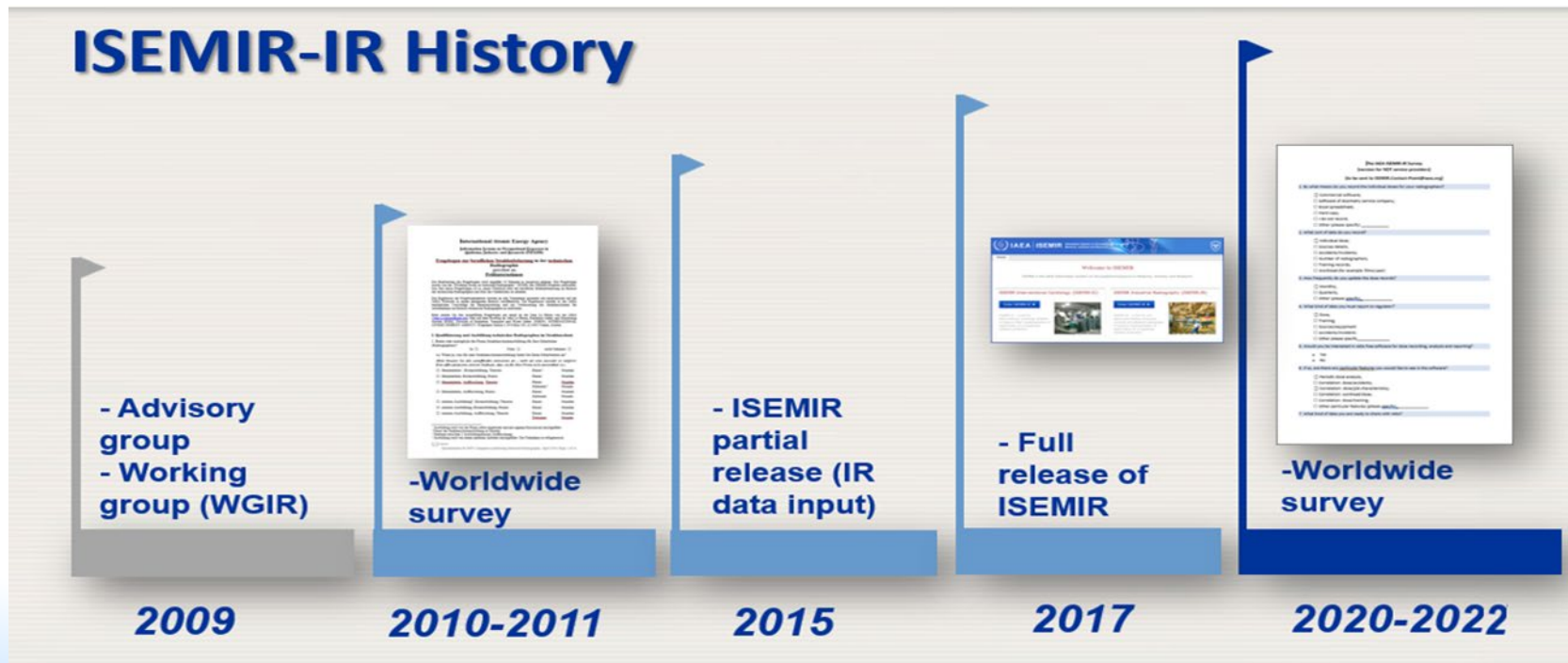
ISEMIR-IR

Rationale for an International Database (iDB)

- The worldwide survey of the WGIR showed

  - significant occupational doses do occur,
  - accidents do happen, and
  - the variation in occupational dose per radiographic exposure is considerable (a metric for assessing optimization of protection)

- This in turn shows that there is a need for
  - considerable improvement in occupational radiation protection
  - implementation of optimization of protection

ISEMIR-IR aims and access

ISEMIR-IR: Industrial Radiography

ISEMIR-IR, the Information System on Occupational Exposure in Medicine, Industry and Research focusing on industrial radiography, is a tool for non-destructive testing companies to optimize radiation protection.

Access
ISEMIR-IR

ISEMIR-IR aims at:
- facilitating the implementation of ALARA practices and effective exposure management;
- providing efficient collection and maintenance of data on occupational exposure, radiation practices and incidents;
- allowing non-destructive testing (NDT) companies to benchmark their own facility and individual radiographers' performances against global or regional data to define follow-up actions to address identified gaps and disseminate lessons learnt; and
- contributing to minimizing the likelihood of accidents, e.g. by identifying pre-cursors, user
- Promoting the use of ISEMIR-IR system in the NDT operators

ISEMIR-IR is **free of charge** via a NUCLEUS account

What are the benefits of participation

- To improve **occupational radiation protection** of workers
- To provide for efficient data **collection and maintenance** on occupational exposure and radiation practices
- To analyze the **trends** of occupational doses of individuals, **companies** against **global** or **regional data**
- To identify **good practices** as well as **gaps**
- To define follow-up actions to address **identified gaps** and disseminate **lessons** learnt

Who can participate?

Primary for operators (facilities) from:
1. Non-destructive testing (NDT) companies carrying out industrial radiography

Roles:
1. Coordinators (managers or RPOs)
2. Occupationally exposed workers

- Participation is free

ISEMIR http://nucleus.iaea.org/isemir

1. How does it work
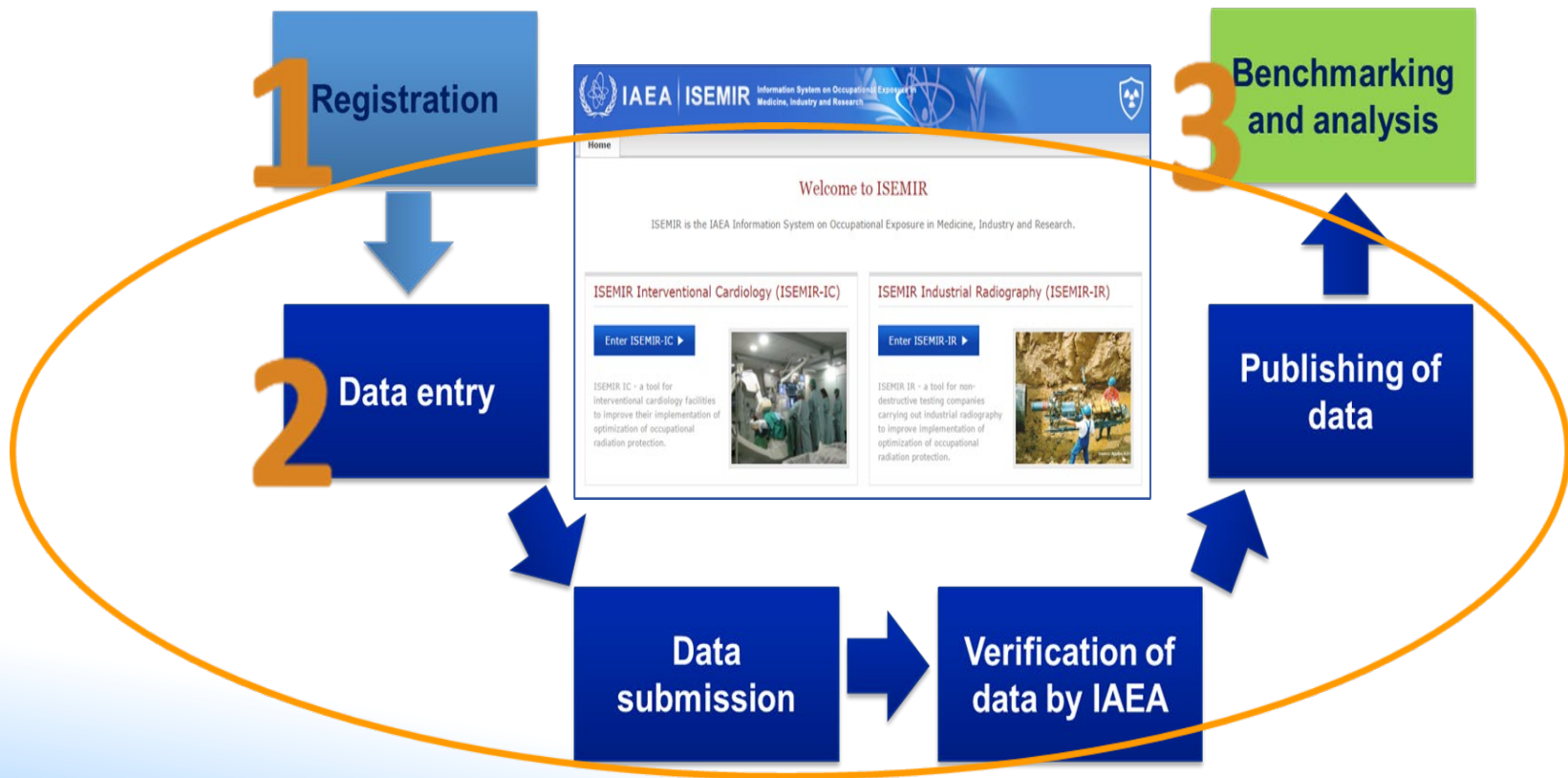
ISEMIR-IR: Data entry

- ➢ 6 UN languages
  - ▪ English, Arabic, Chinese, French, Russian, Spanish
- ➢ Reporting is done annually (July-Sept)
- ➢ Data is confidential and anonymous
- ➢ 2 datasets:
  - ▪ Company/facility
  - ▪ Individual
- ➢ Flexible in terms of data collection
- ➢ Mandatory fields related to dose information

Annual Submissions

Type of data set	Summary	Action
Radiation Sources	View/Edit Data Radiography Sources	View/Edit Data
Company procedures	Company procedures	View/Edit Data [Delete]
Dose information	Occupational workers' information	View/Edit Data [Delete]
Company events	Company events	View/Edit Data [Delete]
Personal information	View/Edit Data Personnel Info	View/Edit Data

Comments

ISEMIR-IR

ISEMIR-IR Data entry

IR data entry − personnel and company:

➢ **Annual collective doses**, minimum detectable level
➢ Annual dose distribution
➢ Radiographic **workloads** - number of radiographic films exposed in a year
➢ Radiation protection **training** (RP qualification, initial/refresher training)
➢ Radiography **sources used**
➢ Company Procedures: investigation levels, preventive maintenance of devices, Internal compliance inspections, assessment of radiographers (Use of collimators, survey meters, reading dosimeters, etc.
➢ Number of company events (**incidents, accidents**)
➢ Personal information: Professional roles in ISEMIR-IR: assistant to the radiographer, industrial radiographer, manager, RPO, source recovery, trainee

Yellow marked: Optional

Current data supports of ISEMIR-IR system

The database supports three broad types of analyses:

- Occupational doses per radiographic exposure for a given industrial radiographer as a function of personnel and facility attributes;

- Benchmarking; and

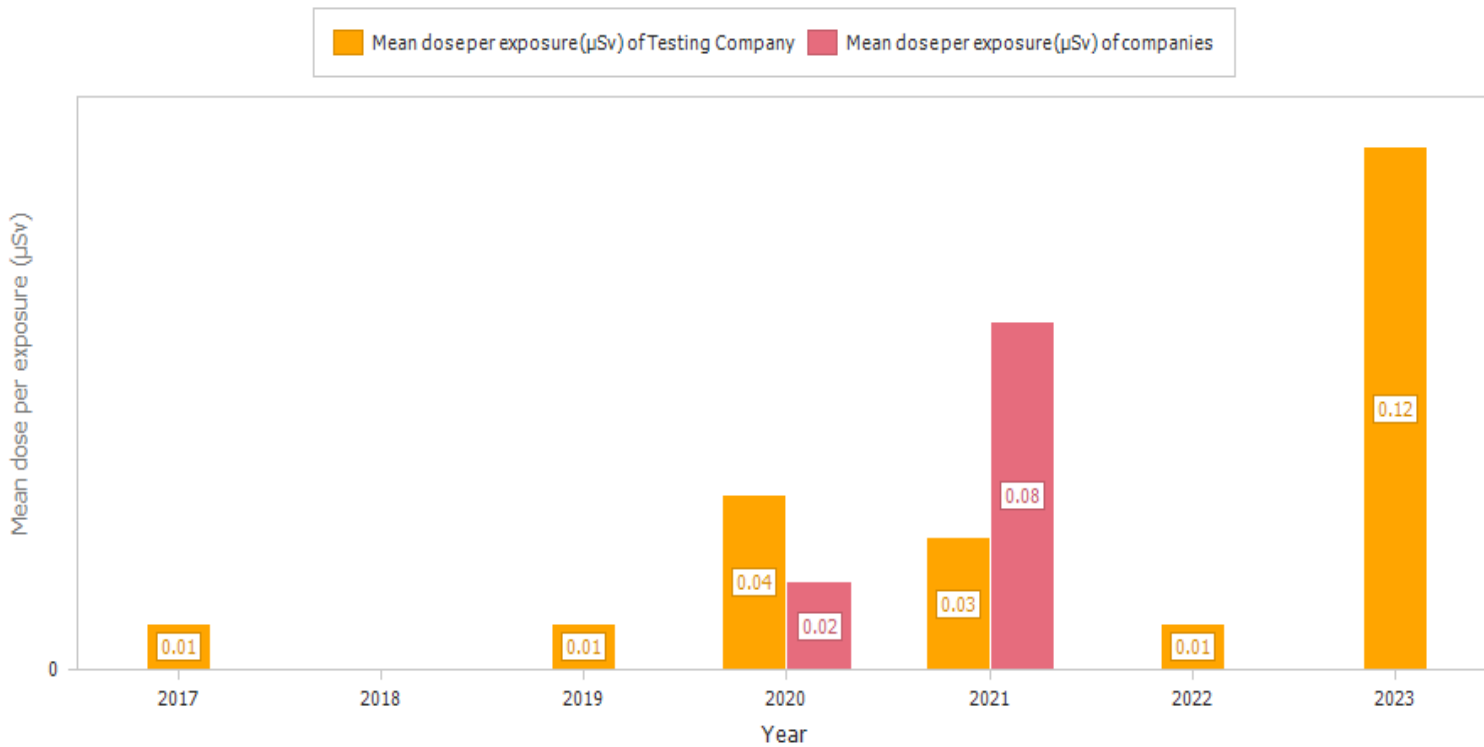- Trends with time (per radiographic exposure over successive years)

Company-based dose report
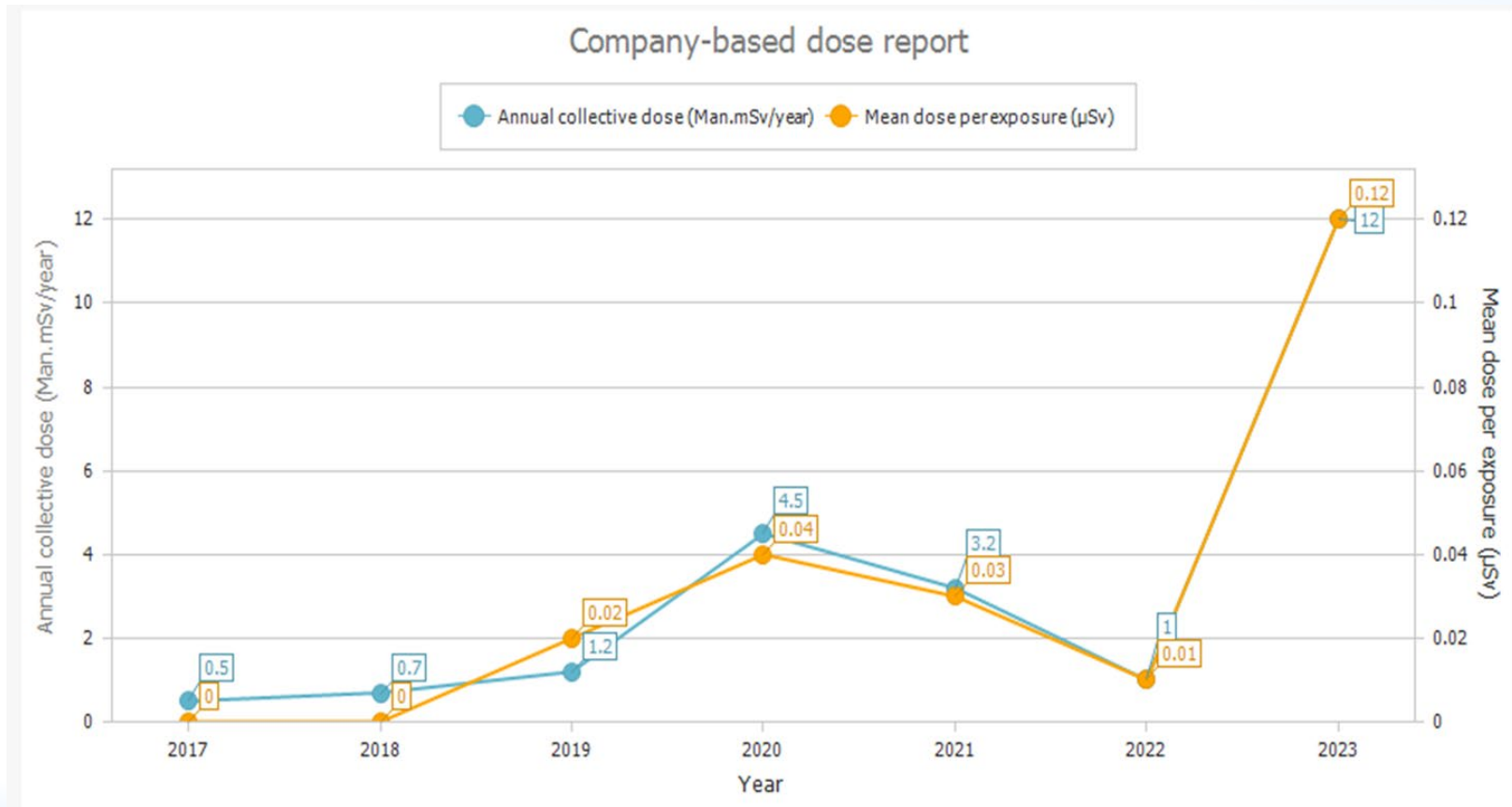
Mean dose per exposure of a company over time compared with values of companies

Mean dose per exposure of Testing Company over time

Legend: Mean dose per exposure (µSv) of Testing Company — Mean dose per exposure (µSv) of companies

2017: 0.01
2019: 0.01
2020: 0.04 / 0.02
2021: 0.03 / 0.08
2022: 0.01
2023: 0.12

Current Participants

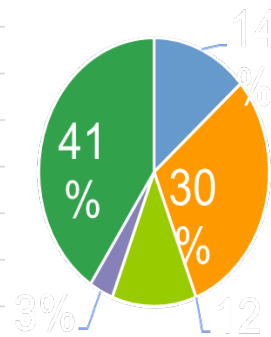| Region |
|--------|
| Africa |
| Asia and the Pacific |
| Latin America and Caribbean |
| North America |
| Europe |
| **Total** |

ISEMIR-IR Participation as of 25 September 2024
344 NDT companies ⟶ 59 countries
Registered users (from NDT companies): 74

Current Participants-List of countries

1 Argentina	16 Estonia	31 Kenya	46 Qatar
2 Australia	17 Finland	32 Lebanon	47 Saudi Arabia
3 Bahrain	18 France	33 Lithuania	48 Singapore
4 Bangladesh	19 Georgia	34 Luxembourg	49 Slovakia
5 Belgium	20 Germany	35 Malaysia	50 Slovenia
6 Brazil	21 Ghana	36 Mauritius	51 Switzeralnd
7 Cameroon	22 Greece	37 Morocco	52 Thailand
8 Canada	23 India	38 Netherlands	53 Trnidad and Tobago
9 China	24 Indonesia	39 New Zealand	54 Turkey
10 Colombia	25 Ireland	40 Nigeria	55 Ukraine
11 Croatia	26 Israel	41 Pakistan	56 United Kingdom
12 Cyprus	27 Italy	42 Paraguay	57 Uruguay
13 Czech Republic	28 Japan	43 Peru	58 USA
14 Denmark	29 Jordan	44 Poland	59 Zambia
15 Egypt	30 Kazakhstan	45 Portugal	

Legend:
- Africa
- Asia and the Pacific
- Latin America and Caribean
- North America
- Europe

Pie chart values: 14%, 30%, 12, 3%, 41%

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Promotional Activities of ISEMIR-IR

- **<u>Dissemination of information of ISEMIR-IR activities</u>**
- Publication of results of ISEMIR-IR global surveys (IAEA – TECDOC 1447 (First survey), Second and Third survey
- Annual ISEMIR-IR reports (2019, 2020 and 2022)

  Global survey results and annual reports available at:

  https://www.iaea.org/topics/information-system-on-occupational-

  exposure-in-medicine-industry-and-research-industrial-radiography

Promotional Activities of ISEMIR-IR (2)

- **Role of ISEMIR National Contact Person (NCP)**
- Nominated by IAEA Member States (1 NCP per country per topical area)
- Current number of ISEMIR-IR NCP (as of 25 Sept 2024): 44
- Terms of reference for NCP (coordinate ISEMIR activities in the country)

Some duties:

- Encouraged to promote ISEMIR-IR information in their countries
- Share information on ISEMIR-IR in NDT national and regional seminars, conference, educational programs and webinars
- Facilitate registration for NDT companies in their member states and encourage them to enter data
- Identify and recognize relevant organizations in the country

Promotional Activities of ISEMIR-IR (3)

- **Promotion activities from experts** in conferences, seminars, workshops, symposium:4 (in 2023);
- - BINDT Conference (UK), Conference of EFNDT (Portugal), International symposium (LA), Stakeholders meeting (Canada)

- **International events**
- - IAEA International Conference on Occupational Radiation Protection, Geneva, Switzerland (2022)
- - World Conference on Non-destructive testing (20th WCNDT), 27-31 May 2024

- **Other promotions:**
- - IAEA and ORPNET webpages (news, events etc.)
- - IAEA Regional and Interregional events (meetings, training etc.)
- - Occupational Radiation Protection Appraisal Service (ORPAS)

Recent ISEMIR-IR upgrade

- Enabled 6 United Nations languages (Arabic, Chinese, English, French, Russian and Spanish)

- Reviewed questions to make them clearer (e.g., 26% of mandatory questions converted to optional questions, use of Yes/No scroll-down)

- Consolidated the ISEMIR-IR system by adding 153 data sets from the 3rd ISEMIR-IR survey (Need final verification by respective NDT companies)

ISEMIR-IR upgrade (2)

- Validation check − e.g., dose information (minimum detectable level), frequency of company procedures (allows realistic data ranges);

  -Company procedures: e.g. Interval between

  preventive ; maintenance (months): From 1 and 12

  Assessment of radiographers per year: From 1 and

  12 months

- Overall functionality checked and found very good

ISEMIR-IR upgrade (3)

- NDT companies to use the upgraded ISEMIR-IR by filling and submitting data

- Provide feedback on system functionality and languages checks

- Correspondences:

  ISEMIR-IR.Contact-Point@iaea.org

ISEMIR-IR priorities

- Enhancing routine operation
- Undertaking regular global surveys
- Promotion to attract more users
- Regular disseminating of outputs
-     - ISEMIR-IR Annual Report 2023 (In pipeline)

Summary

- ISEMIR-IR is an online benchmark tool to improve the optimization of occupational radiation protection in industrial radiography

- ISEMIR-IR system has been upgraded to provide choice of languages (6 UN languages) and easier submission of annual occupational data

- ISEMIR-IR users are encouraged to provide feedback on this tool

- New users/NDT companies are welcome to join ISEMIR-IR

Thank you!

ISEMIR-IR.Contact-Point@iaea.org