



IAEA

International Atomic Energy Agency
Atoms for Peace and Development

IAEA Radiation Safety Projects implemented in cooperation with the US Federal Authorities

**update on activities
ISCORS meeting on 28 Nov 2023**

**Division of Radiation, Transport and Waste Safety
Radiation Safety and Monitoring Section
Miroslav Pinak**

1. Supporting preparation of international Basic Safety Standards
2. Supporting implementation of the international Basic Safety Standards
3. Enhancing radiation safety through efficient and modern dosimetry
4. Radiation protection awareness online training
5. 3rd International Conference on Occupational Radiation Protection and NORM X Symposium
6. Ensuring long-term competence in radiation and waste through E-learning and other online resources
7. Establishment & maintenance of national dose registries
8. Enhancing radiation protection of workers through the Occupational Radiation Protection Appraisal Service (ORPAS) in the Member States
9. Strengthening safety assessment, optimization and promotion of safety culture in the organizations, facilities and activities
10. Cooperation with Fukushima Prefecture in the area of radiation monitoring and remediation
11. Communication on radiation safety: Radiation Safety Navigator

Current status of US ongoing assistance



- Supporting implementation of the international Basic Safety Standards
- Enhancing radiation safety through efficient and modern dosimetry
- Radiation protection awareness online training
 - Radiation protection training for occupationally exposed workers (OEWs)
 - Strengthening operation of the information system on occupational exposure in medicine, industry and research (ISEMIR)
 - Enhancing radiation protection of workers in industrial processes involving NORM (ISEMIR-N)
 - Improving information about staff doses in interventional cardiology (ISEMIR-IC)
 - Implementing the safety in radiation oncology system for the support of safe use of therapeutic medical radiation technology (SAFRON)
 - Implementing the strengthening radiation safety culture in medicine (RADCULMED)
 - Implementation of the Specific Safety Guide on Radiation Protection and Safety in Medical Uses of Ionizing Radiation (SAFEMED)
- Establishment of national dose registries
- Enhancing Radiation Protection of Workers through the Occupational Radiation Protection Appraisal Service (ORPAS) in the Member States
- Strengthening safety culture in the organizations, facilities and activities in industrial radiography and other applications
- Communication on radiation safety: Radiation Safety Navigator
- Development of tools to raise awareness on public exposure to natural radiation, namely radon and self-protection
- Development of comprehensive training material on GSR Part 3 and related guidance

The following projects are offered for cooperation on and are also seeking assistance from US:

- Developing Regulatory Infrastructure and improving Safety
- Ensuring Long-Term Competence in Radiation, Transport and Waste Safety Through E-Learning and Other Online Resources
- Develop, Promote and Conduct Peer Reviews and Advisory Services to Enhance National Radiation Safety Infrastructure
- Advanced Radiation Monitoring Technology Infrastructure



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Project Status Update

Supporting Preparation of the International Basic Safety Standards

Facilitation of the implementation of GSR Part 3 through the organization of national and regional workshops



RASSC priority for the current term (2021-2023)

GC(66)/RES/6 [...] further requests the Secretariat to continue to organize national workshops on implementing GSR Part 3, upon request

Support by the U.S since 2019

Major benefits:

- Can be tailored to address specific issues of importance in the host country while also providing the opportunity for all relevant stakeholders to jointly discuss such issues.
- Coordination of work between different government agencies.

Countries hosted national and regional workshops from 2014 to 2021:

- National Workshops: Romania, south Africa, UAE, China, Thailand, Saudi Arabia , Bahrain, Oman, Botswana, Morocco, Mongolia, Cameroon
- Regional workshops in: Malaysia, Costa Rica, Ukraine, Uruguay, South Africa, Philippines, Ghana, Tanzania, Argentina, China, Singapore, Cyprus

Regional workshops in 2022 in Brazil and Thailand, and in 2023 in Czech Republic and Zimbabwe on existing exposure situations, in Tajikistan on commodities, ...

Other workshops planned in 2023 Argentina, Portugal, ...

Support by US in all regional workshops. An US expert was part of the IAEA team in all 2022-23 regional workshops. IAEA great appreciation to CRCPD (special thanks to its Executive director), support providing names of experts on specific request, including Spanish speaking experts to support the Latin America region)

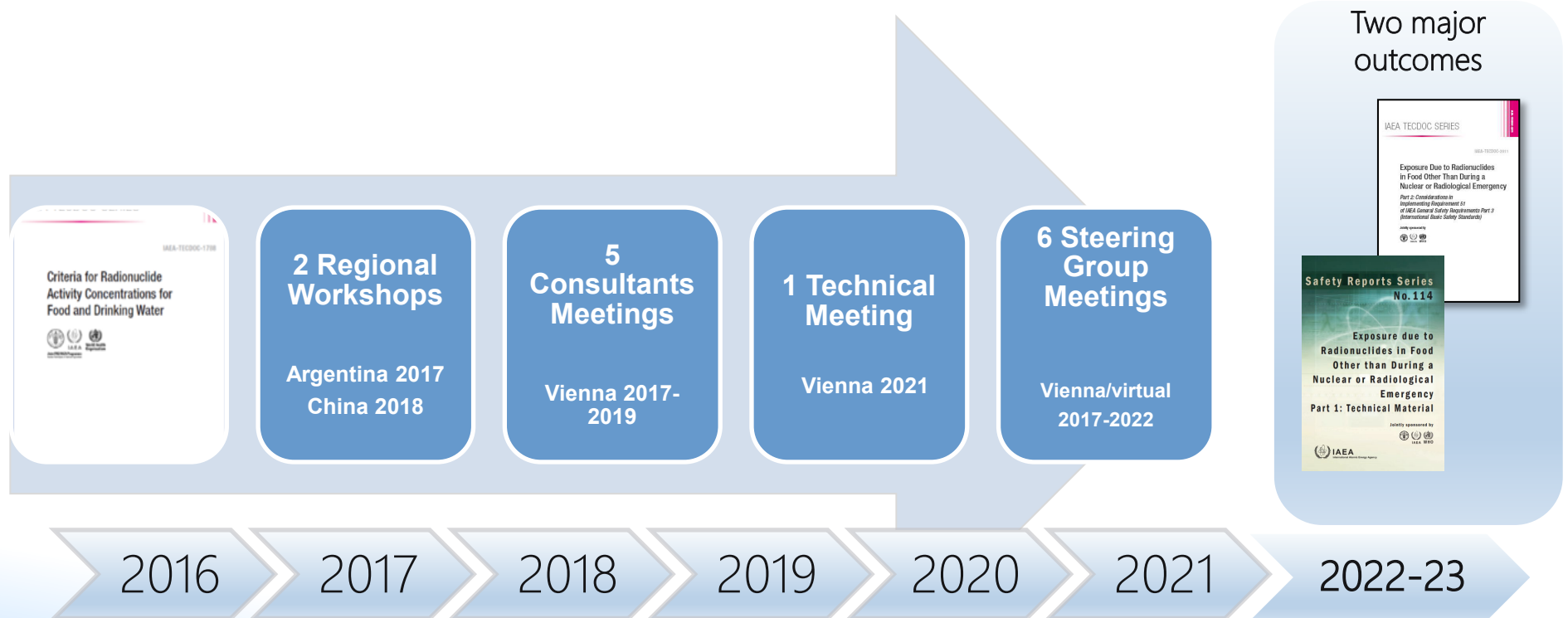
Radiation safety of food, feed and drinking water in non-emergency situations

Several Resolutions since 2014

GC(66)/RES/6 2022(80)

Preparation of a summary paper on radionuclides in feed and food, including drinking water, and, in collaboration with the FAO and WHO and interested Member States, to promote discussion of and potential application of the recently released document on 'Exposure Due to Radionuclides in Food Other Than During a Nuclear or Radiological Emergency'

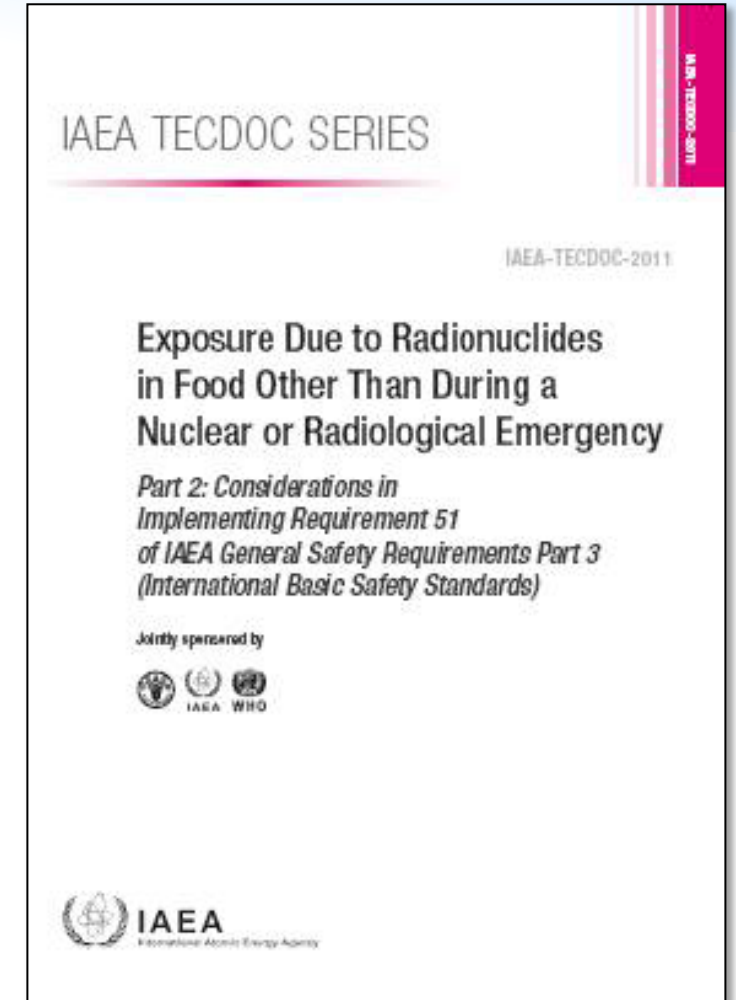
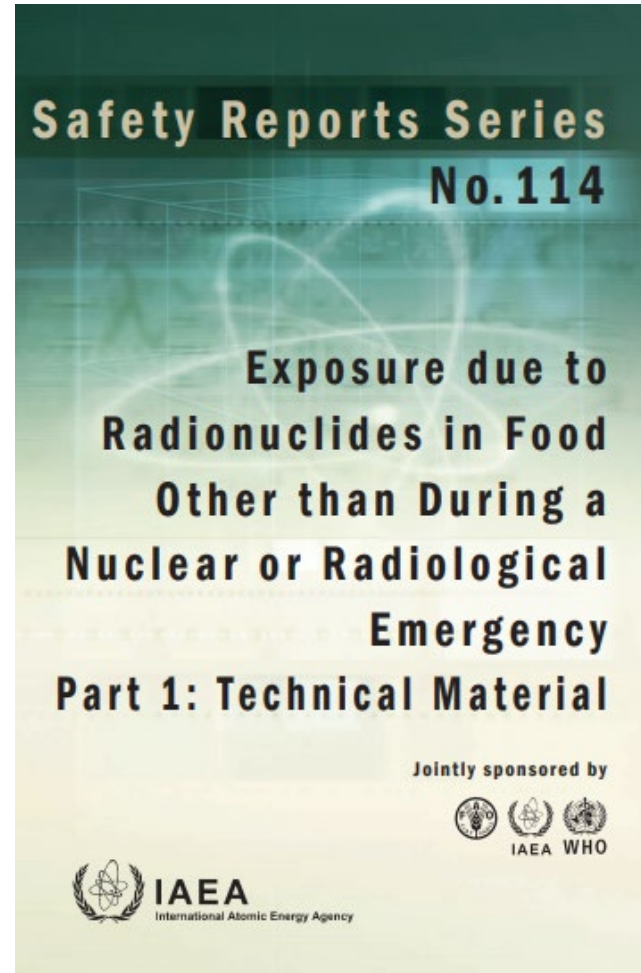
More than 7 years joint IAEA-FAO-WHO project with involvement of Member States



Outcomes of the project: SR No. 114 & TECDOC 2011

OUTLOOK GC(67)/RES

87. Urges the Secretariat, following recent work of the Codex Committee on Contaminants in Foods, in collaboration with the FAO, WHO and interested Member States, to promote discussion of and potential application of the recently released documents ‘Exposure Due to Radionuclides in Food Other Than During a Nuclear or Radiological Emergency’, parts 1 and 2;



Request to US to promote discussion and potential application of SRS No 114 and TECDOC-2011

Statement on Managing Exposure Due to Radon at Home and at Work

- Position statements of International Organizations
- Co-sponsors of GSR Part 3
- Includes background discussion on radon and progeny exposure characteristics and pathways
- GSR Part 3 & 2013/59/Euratom Directive
- Recent developments in Rn DCFs based on ICRP 137 (occupational intakes of radionuclides) with comparison to UNSCEAR values
- Outcomes of 2019 IAEA Technical Meeting on the Implications of the new DCFs for radon



MANAGING EXPOSURE DUE TO RADON AT HOME AND AT WORK

Information overview prepared by the Inter-Agency Committee on Radiation Safety (IACRS)

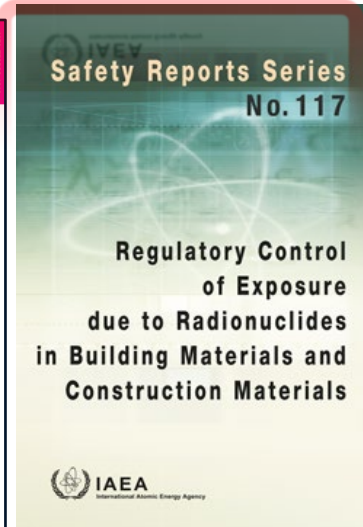
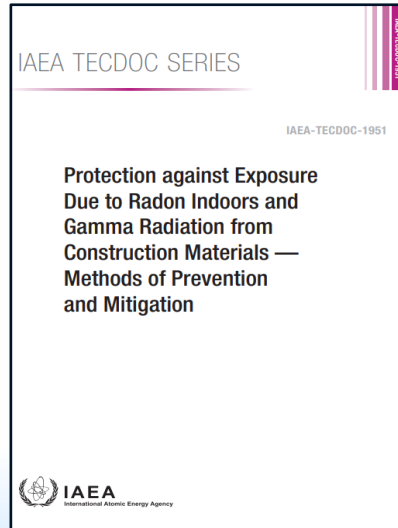
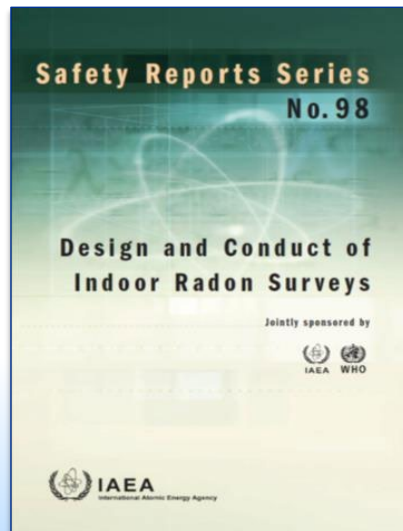
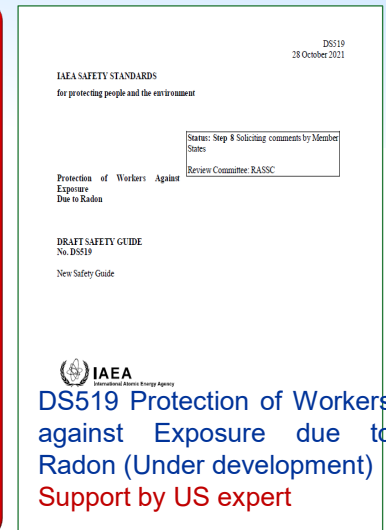
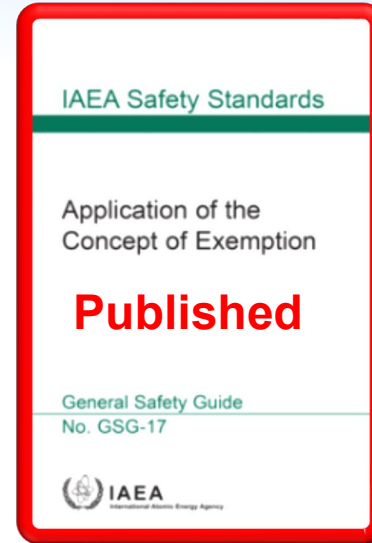
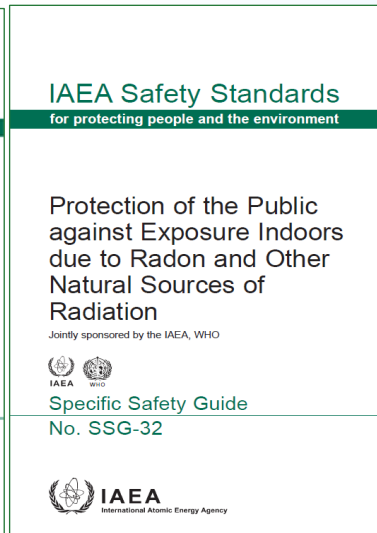
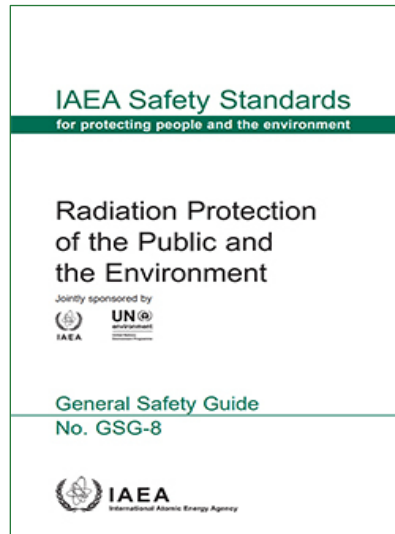
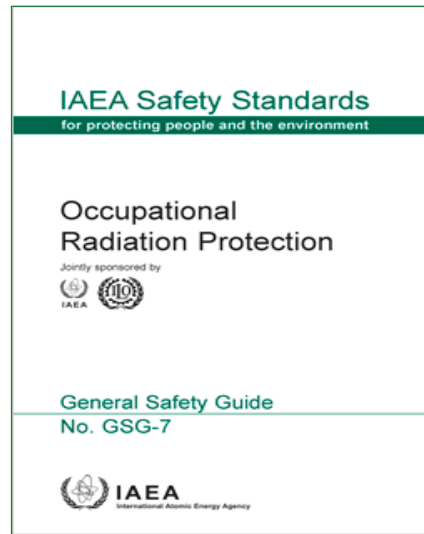
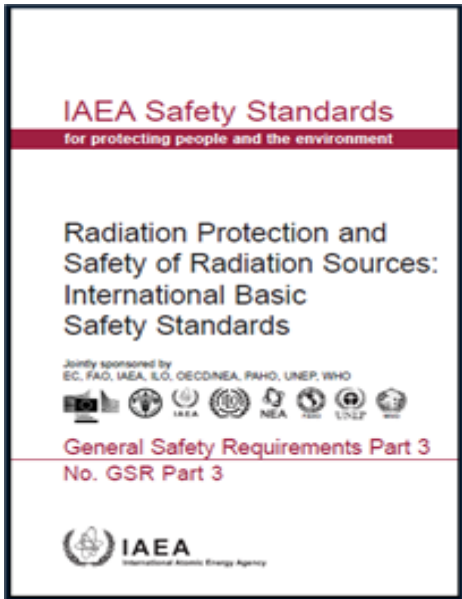
July 2020

Key messages

- Radon occurs naturally in the environment and is the main source of exposure to ionizing radiation for many people. It is the most significant cause of lung cancer after smoking.
- Control of radon to protect people in homes and most workplaces is guided by reference levels for radon concentrations in air. However, in planned exposure situations, where dose limits are used, protection of workers requires calculation of the radiation dose due to radon exposure using a dose coefficient or dose conversion factor (DCF).
- The DCFs used internationally to calculate doses from all radionuclides for purposes of radiological protection are provided by the International Commission on Radiological Protection (ICRP). The new DCF [ICRP 2017] for occupational exposures to radon results in doses approximately twice those calculated using the DCF previously set by ICRP [ICRP 1993].
- UNSCEAR has also been evaluating the health effects of radon and has derived DCFs since the 1980s. In its recent review of the scientific evidence on lung cancer risk from inhaled radon and its progeny, UNSCEAR concluded that its DCF remains appropriate for estimating radon exposure levels in its dose assessments for public and workers [UNSCEAR 2019].
- The October 2019 IAEA Technical Meeting on the Implications of the new DCFs for radon, recommended the use of a DCF of 10 mSv per working level month (WLM) [ICRP 2017] as the default for workplaces unless a different DCF is justified by specific aerosol characteristics.
- It is up to individual national authorities to decide if and when to implement the new ICRP DCF for radon. This could be carried out immediately, but it may be practical to do so once the full set of revised ICRP DCFs for workers are available to ensure a consistent approach for all radionuclides. All revised occupational DCFs are expected to be available within a year.
- The IACRS supports the continued implementation by national authorities of the approaches reflected in the IAEA General Safety Requirements Part 3 (GSR Part 3, also referred to as the International Basic Safety Standards or simply the BSS) [IAEA 2014] for managing exposure due to radon in homes and workplaces, with emphasis on optimization of protection and the use of a graded approach.
- The IACRS will monitor further developments regarding the estimation of DCFs for radon, will evaluate the potential implications for managing exposure due to radon at home and at work and will review/update this information overview if warranted.

[The Statement](#)

Set of standards and guidance supporting GSR Part 3 on protecting against radon



Two new initiatives with key US support

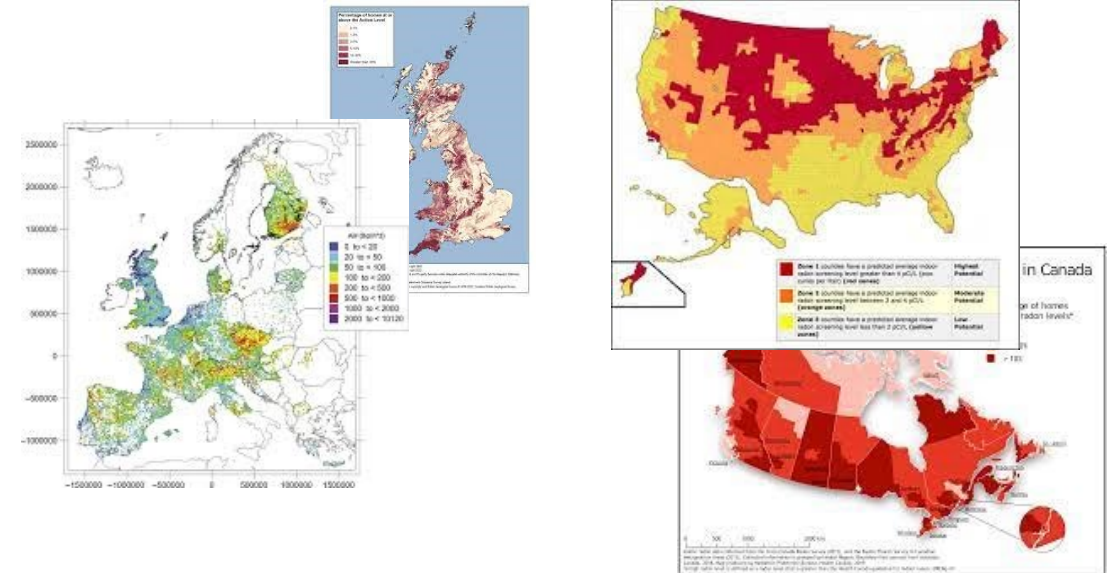
Worldwide “Radon awareness day”

- IAEA initiative to launch the “Radon awareness day” building on the Radon Awareness Week run by the US CDC and other similar initiatives at national and regional level



Worldwide “Atlas of radon”

- CRCPCD-IAEA collaboration exploring the possibility of US contributing to a possible worldwide atlas of natural (radon) radiation.



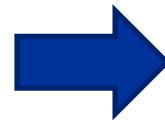
US support for both initiatives is key for their success
CRCPCD, CDC, NRC key players. Other US actors are welcome to join

New General Guidance on Existing Exposures Situations (ExES)

While numerous guidance documents are either available or in the pipeline, **Member States have expressed the need for a more overarching guidance to meet GSR Part 3 requirements for EES.**

Table 2 Existing Guidance including some recommendations on EES in function of the type of situation as specified in Section 5 GSR Part 3¹

GSR Part 3 Section 5	Scope	Subject areas	Legend:
5.1(a)	Exposure due to contamination of areas by residual radioactive material		<ul style="list-style-type: none"> Green box: Safety Guide, published Blue box: Safety Report Series publication, published Black box: TECDOC, published Grey box: not yet published document Red box: planned document
5.1(a)(i)	Past activities that were never subject to regulatory control or that were subject to regulatory control but not in accordance with the requirements of these Standards	Contamination of areas by residual radioactive material	<ul style="list-style-type: none"> Remediation strategy and process of areas affected by past activities or events SR on Living and working in long-term contaminated environments Long term post-remediation management of areas affected by past activities or events
5.1(a)(ii)	A nuclear or radiological emergency, after an emergency has been declared to be ended	Contamination of areas by residual radioactive material	<ul style="list-style-type: none"> GSG-7 Remediation strategy and process of areas affected by past activities or events SR on Living and working in long-term contaminated environments Long term post-remediation management of areas affected by past activities or events
5.1(b)	Exposure due to natural sources		<ul style="list-style-type: none"> Green box: Safety Guide, published Blue box: Safety Report Series publication, published Black box: TECDOC, published Grey box: not yet published document Red box: planned document
5.1(c)	Exposure due to natural sources		
5.1(c)(i)	²²² Rn and its progeny and ²²⁰ Rn and its progeny in workplaces other than those workplaces for which exposure due to other radionuclides in the uranium decay chain or the thorium decay chain is controlled as a planned exposure situation, in dwellings and in other buildings with high occupancy factors for members of the public	Radon, Thoron	<ul style="list-style-type: none"> GSG-7 GSG-8 SSG-32 DS19 SRS-33 SRS-58 TECDOC-1951
5.1(c)(ii)	Radionuclides of natural origin, regardless of activity	Commodities	<ul style="list-style-type: none"> GSG-8 DS499 SR Trade of commodities SR-117 Building and construction materials TECDOC-1951 Remediation and prevention (last chapter deals with building and construction materials) GSG-8
5.1(c)(iii)	Materials, other than those stated in (c)(ii) above, in which the activity concentration of no radionuclide in either the uranium decay chain or the thorium decay chain exceeds 1 Bq/g and the activity concentration of ⁴⁰ K does not exceed 10 Bq/g	NORM	<ul style="list-style-type: none"> TECDOC-1951 Remediation and prevention (last chapter deals with building and construction materials) GSG-7 SR Living and working in long-term contaminated environments SSG-5 Remediation GSG-5 SSG-60 DS499 DS19 SRS-49 SRS-72 SRS-51 SRS-68 SRS-76 SRS-78 TECDOC-1660 TECDOC-1951 SR Living and Working in long-term contaminated environments
5.1(c)(iv)	Exposure of aircrew and space crew to cosmic radiation	Cosmic radiation	<ul style="list-style-type: none"> GSG-7



NEW GSG

Step 5

IAEA Safety Standards

for protecting people and the environment

SPSS F
Document Preparation Profile (DPP)
Version 1 dated 01.09.2022

1. IDENTIFICATION

Document Category: General Safety Guide

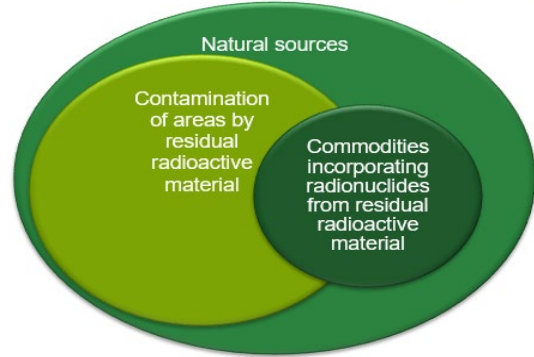
Working ID: DS544

Proposed Title: Radiation Protection and Safety in Existing Exposure Situations

Proposed Action: New Safety Guide to support GSR Part 3 Requirements

Review Committee(s) or Group: RASSC (lead), WASSC, EPReSC

Technical Officer(s): Olvido Guzmán López-Ocón



Overarching guidance on existing exposures situations (EES)



The guide aims at **bringing consistency** in the scope and management of EES **and filling gaps of existing guidance**.

Strategic approach

- In depth gap analysis of existing/planned/under development guidance
- Additional consultancy meetings involving experts in the different types of EES
- National and regional information and experience sharing through TM and/or workshops. Regional workshops held in Latin America, Asia, Europe & Africa,
US support to all regional WS on EES. US expert support in all of them
- Other events, as appropriate

Ambitious and needed project involving multidisciplinary approaches and backgrounds to address the comprehensive set of different EES and associated challenges with high potential benefit worldwide – **only possible with high involvement and support from MS.**

PROPOSED TABLE OF CONTENT

1. Introduction
2. Identification of existing exposure situations (EES)
3. Responsibilities of Regulatory Bodies, other relevant Authorities, operating organization and other relevant organizations
4. Establishing Reference Levels
5. Provisions for the management of EES in the Legal and Regulatory Framework
6. Establishment of National Protection Strategies
7. Protection of public, workers and the environment in EES
8. Application of Graded Approach
9. Justification for protective actions and optimization of protection and safety
10. Communicating and raising awareness in public/non expert groups
11. Involvement of interested parties in decision-making process

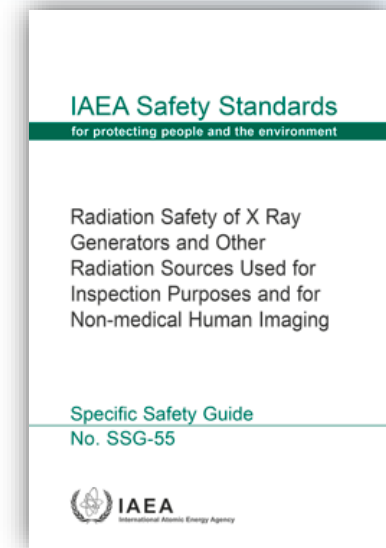
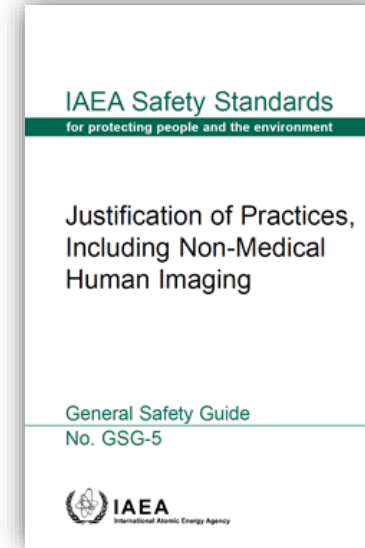
DEFINITIONS
REFERENCES
ANNEXES

Non-medical human imaging (NMHI)

GC(67)

- 85. Requests the Secretariat, upon request by Member States, to continue to assist with the implementation of radiation protection guidance for the regulatory control of the use of human imaging techniques for non-medical purposes;

Recent IACRS Information paper on-Non-medical human imaging, June 2022, <http://www.iacrs-rp.org/products/iacrs-nmhi.pdf>



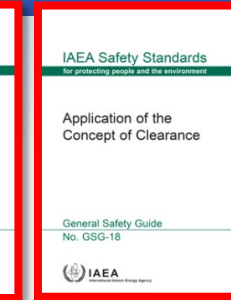
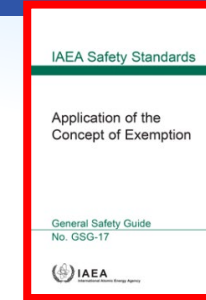
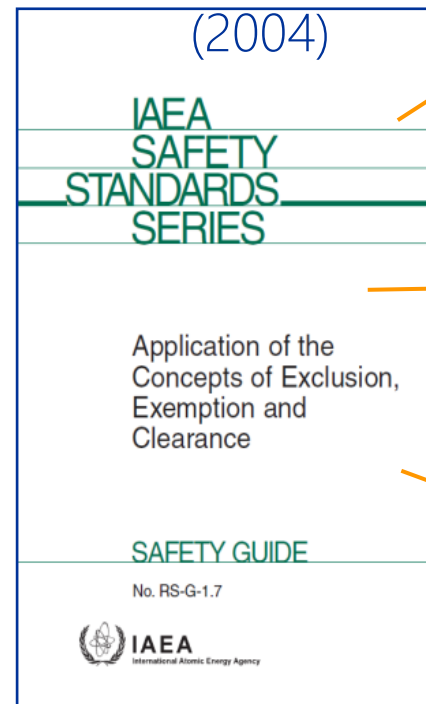
Increased interest from Member States and International Organisations.
IAEA assistance in NMHI needs EB support

GC(67) Resolutions

89. Requests the Secretariat to continue its work in order to **develop a Safety Report on international trade of consumer goods containing radionuclides**, in consultation with Member States and relevant international organizations;

90. Welcomes the Secretariat's efforts to develop Safety Guides on the 'Application of the Concept of Clearance' and on the 'Application of the Concept of Exemption', and **encourages the Secretariat to promote international consistency in applying these Safety Guides to facilitate safe transboundary shipments of materials**;

- Wide interests from the Member States
- Exemption is also a cross cutting subject on nuclear security
- Wider issues in relation to international trade of commodities at border controls
- Development & implementation **need additional resources**



Safety Guide on Application of the Concept of Exemption (GSG-17) Published

Safety Guide on Application of the Concept of Clearance (GSG-18) Published

Safety Report on International trade Under development

Technical Meeting on Radiation Safety in International Trade of Non-Food Commodities (1-4 August 2023, Vienna)

US NRC Kevin Williams Vice Chair of the meeting

Presentations by US NRC and CRCPD

33 Member States

International Organizations (MS greatly appreciated their presence): WCO, WTO, UNSCEAR, UNCTAD, EC, HERCA, CRCPD, ICRP



Joint CRCPD-IAEA initiative to develop a worldwide **database for information sharing on commodities and international trade was warmly welcome** and strongly supported by participant MS.

Joint CRCPD-IAEA plans to develop training, e-learning and other awareness material in this field namely addressed to customs officers

Interfaces with nuclear security. Collaboration underway (TRACE Application)

IAEA welcomes continuous US support in this area

Extra-budgetary funds, provision of Cost-Free Experts, provision of experts to support training or technical cooperation activities, funding of Consultants and Junior Professional Officers to work on

- ✓ Development of new guide on management of existing exposure situations, including expertise on remediation, namely after post accident , radon, NORM, commodities, ..
- ✓ Development of worldwide database on commodities (where radioactivity is detected) and international trade
- ✓ Diverse activities related to protection against radon, namely launch of the worldwide radon awareness day and Worldwide Atlas of radon (IT specialized expertise needed)
- ✓ National and regional workshops
- ✓ Dissemination and application of new IAEA guidance on management of radionuclides in food in non-emergencies situations,
- ✓ ...



IAEA

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Technical Cooperation

Supporting Implementation of the International Basic Safety Standards

Implementation of the International Basic Safety Standards



- Ongoing National and Regional Technical Cooperation Project (4 regions: Europe, Latin America, Africa, Asia and Pacific) on implementation of GSR Part 3 and supplementing Guidances

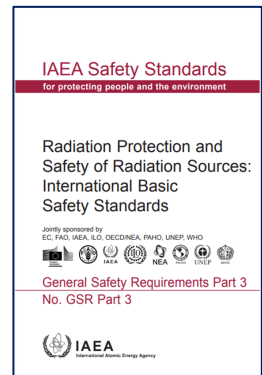
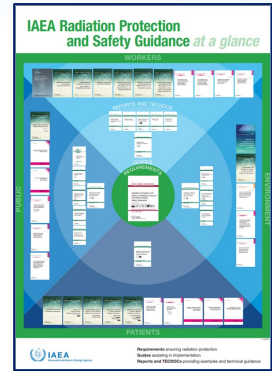
- Occupational
- Medical
- Public and Environment

- Regional and National Workshops
- Experts Missions
- Scientific visits and Fellowships

- Basic Radiation Training Course to be used by MS
- Radiation Protection Training for IAEA OEWs, available online IAEA's Learning Management System from November 2022



- Ongoing work on the release Spanish version
- ORPU e-Learning packages at LMS



726 enrolled users

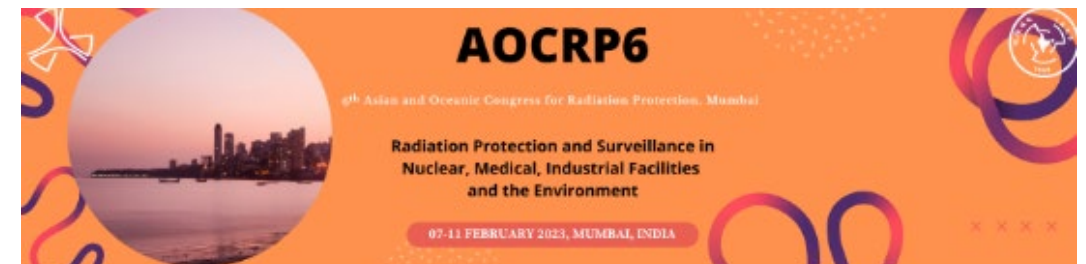
Related publications

- GSG-7 - 17-51861_PUB1785_Book.indb (2020).indd
- GSR Part 3 - Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards | IAEA

Supporting participation of MS in International Events



- ICPR 2021+1, Canada, November 2022
- IRPA Europe, June 2022
- IRPA Africa, October 2022
- IRPA Latin America, October 2022
- IRPA Asia and Pacific, February 2023
- ICRP 2023, Japan, November 2023



Supporting participation of MS in International Events



organized in cooperation with



<http://irpa2024.com/>

- 16th International Congress “**Radiation Harmonization: Standing United for Protection**”, Orlando, 2024, will be organized in cooperation with IAEA
- IAEA will support the participation of candidates from MS (Latin America, Africa, Asia, and Pacific Regions)
 - Through TC Regional Projects in the Latin America Region
 - **EB US Funds** in Africa, and Asia, and the Pacific Region
- IAEA will participate in drafting the Final Programme for the IRPA 16th International Congress, Orlando, 2024



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Project Status Update

Enhancing Radiation Safety through Efficient and Modern Dosimetry

RADSED project objectives

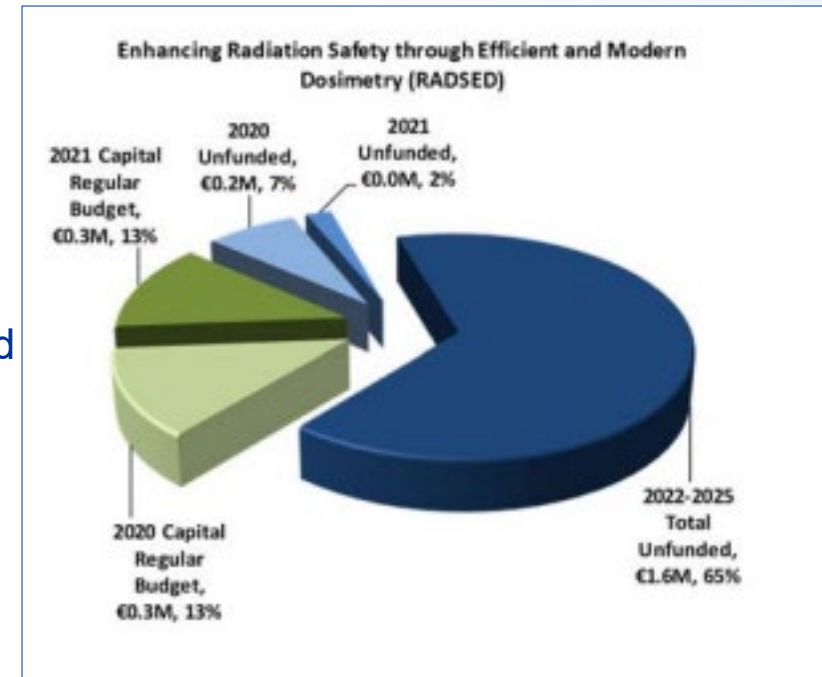


- To evaluate and implement state-of-the-art dosimetry technologies
- To assess occupational exposure of Agency workers and participants in Agency-sponsored events
- To provide recommendations to Member States on optimal technologies for their respective needs
- To disseminate best-practice guidance on individual monitoring of occupational exposure to Member States
- The RADSED project is implemented under the “Major Capital Investment Plan” (MCIP)

RADSED project objectives

Synergies with other IAEA projects and funding

- Radiation safety technical services support delivery of Agency programmes globally and are funded primarily through regular budget of Major Programme 3
- RADSED is funded through a combination of
 - MCIF with planned expenditures of €2.7M until 2026 (€0.9M to date)
 - Voluntary contributions from Japan (€0.8M), Switzerland (€0.1M) and United States (€0.7M)
- Capital replacement is supported through
 - MCIF with planned expenditures of €0.8M until 2026 (€0.3M to date)



Major donors and supporters so far:



Austria



Czech Republic



France



Japan



Switzerland

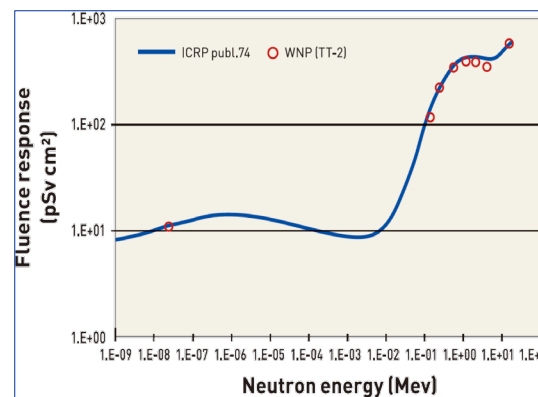


United States

Next-generation personal dosimetry system

Next-generation personal dosimetry for beta, photon and neutron radiation rolling out 2023

- Compact and light-weight design
- Superior photon and neutron response
- Energy-independent dose assessment up to 6.6 MeV photons and 15 MeV neutrons
- Automated and fast readout



Energy dependence of personal dosimeter's neutron fluence response



Personal dosimeter accommodating RPL glass and etched track detectors

Neutron response satisfying ISO 21909-1 performance requirements

- Energy range: 0.025 eV ÷ 15 MeV
- Dose range: 0.1 ÷ 8 mSv (thermal neutrons)
0.1 ÷ 60 mSv (fast neutrons)

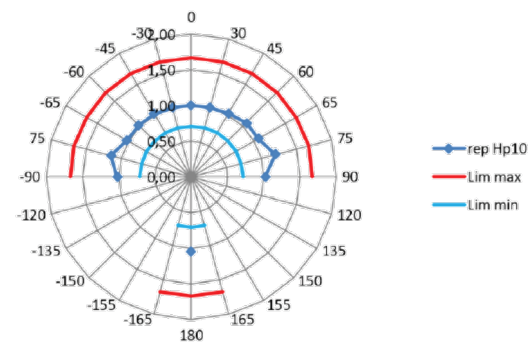
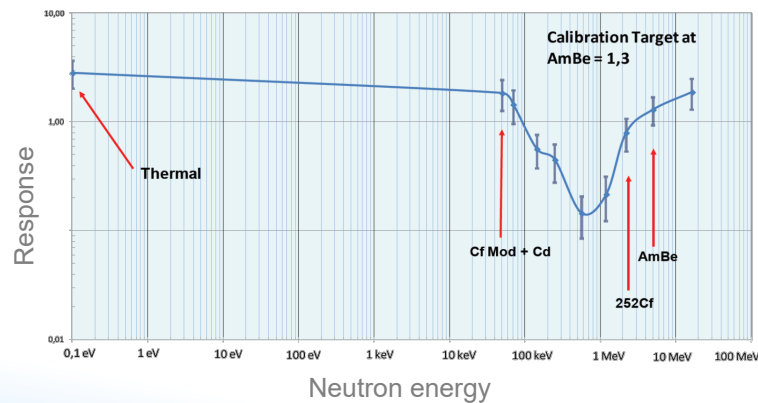
Upgrade of active personal dosimetry inventory

Provision of real-time assessment and alerts to workers in hazardous situations

- Complete type-test documentation according to IEC 61526:2010
- Modular design allowing for detection of photon and/or neutron radiation
- Gradual replacement of ageing stock of electronic personal dosimeters



Personal electronic dosimeter
DMC 3000



Rapid in-vitro bioassay of actinides at enhanced resolution

- Triple quadrupole ICP-MS installation, commissioning and operation training completed
- Method validated for urine uranium bioassay
- Rapid screening method developed for radiological emergencies

Achievable detection limits and minimum detectable doses

- Confirmatory, routine and special monitoring

Experimental protocols and QMS documentation

- Optimization of sample introduction system using cyclonic spray chamber
- Method validation for urine plutonium bioassay



TQ ICP-MS

Electrically refrigerated broad-energy HPGe detectors (Q4/2018)

- Improvements to safety and maintenance over liquid nitrogen cooling
- Increased detection sensitivity for accidental radionuclide uptakes in workers

Temperature-stabilized scanning NaI(Tl) scintillation detector (Q4/2019)

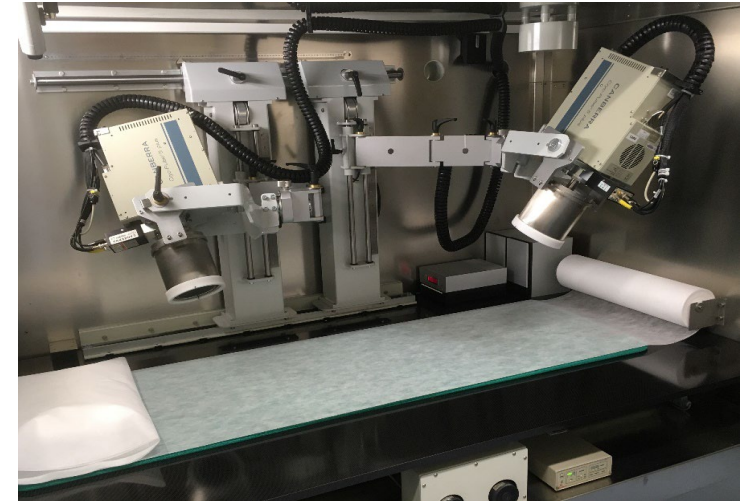
- Elimination of peak-shift problems inherent to scintillation detectors

Numerical calibration methods

- Increased flexibility and adaptable ability to characterize radionuclide uptakes

Implementation of wound monitoring capability at IAEA Seibersdorf

- Improved response to radiological incidents

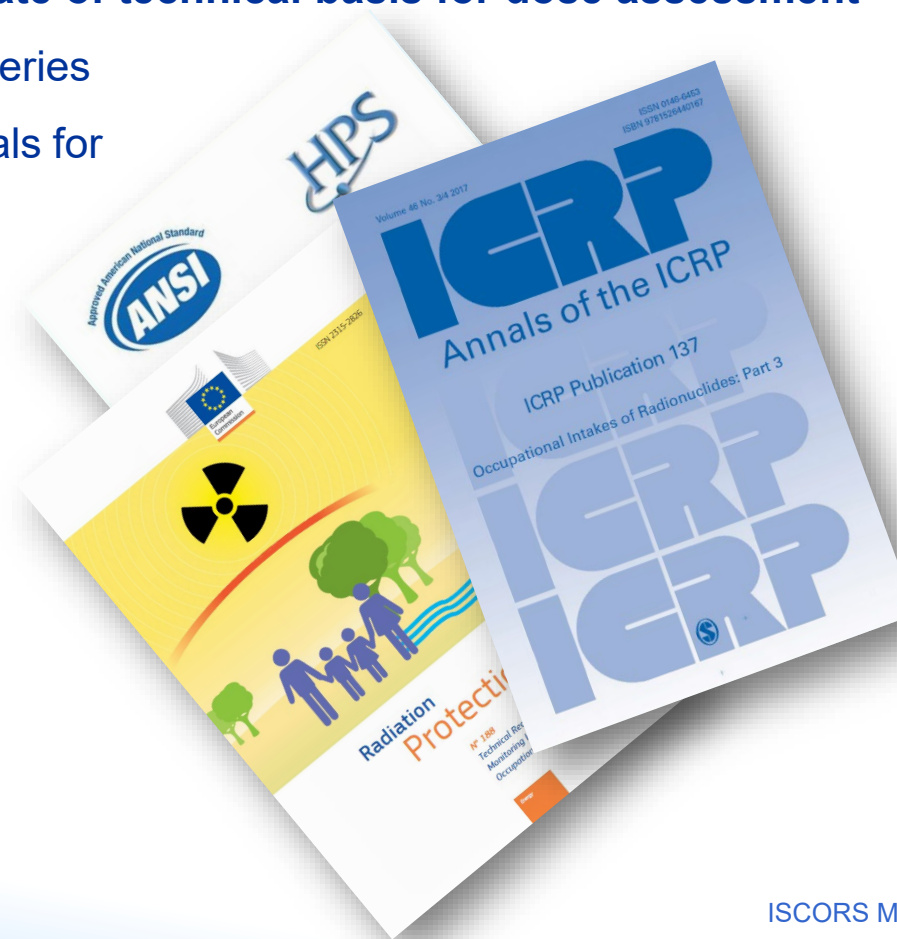


Optimization of internal monitoring programme and update of technical basis for dose assessment

- ICRP Occupational Intakes of Radionuclides (OIR) series
- Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides
- (Inter)national standards (ISO 20553:2006, ISO 27048:2011, ANSI/HPS N13.14-2018)

Development of Internal Dosimetric Analyser

- Software tool to perform dose assessments using dosimetric data from ICRP OIR series
- Available for use by Member State laboratories upon request



Implementation of wound monitoring capability at IAEA VIC and Seibersdorf

- Improved response to radiological incidents

Continual improvement of Laboratory Information Management System

- Essential tool to strengthen implementation of the quality management system

Development and implementation of Centralized Dose Registry

- Maintenance of occupational exposure records according to requirements of GSR Part 3

New operational quantities for external radiation exposure

- Assessment of impact on dosimeter design, dose algorithms and operational radiation protection

Retrospective dose assessment methodologies

- Dose assessment for persons exposed while not wearing dosimeters

Application of artificial intelligence and deep learning to predictive dosimetry

Opportunities for US support



- Provision of Cost-Free Experts, funding of Consultants and Junior Professional Officers to work on selection and implementation of state-of-the-art methodologies and supporting technical basis
- Continued funding for capital equipment with new technologies
- Extra-budgetary funding for consultancies to produce TECDOCs and other means of advising Member States on the adoption of state-of-the-art dosimetry methods

Opportunities for US support



Click on the image to take the virtual tour to the Individual Monitoring Laboratory for the IAEA

New ARTIS Project

Advanced Radiation Monitoring Technology Infrastructure



- Resilient and new Technology for In-Vitro Radiobioassay commissioned for the chemical treatment process and alpha spectrometry. **Replacement of fume hoods cabinets and new alpha spectrometry detectors and workstation**
- **Rehabilitation of Whole-Body Counter and ventilation system at Seibersdorf.** Purchasing of two BeGe detectors and necessary electronics
- New Laboratory Information Technology Upgrade tools developed for the **Service Desk and Centralized Dose Registry.** New software development.
- New Workplace Monitoring Infrastructure capabilities for Radiation Incidents and Emergencies implemented. Upgrading the **continuous air monitoring systems, alpha spectrometry systems, specialized surface contamination detectors, liquid scintillation counter and alpha/beta counting**
- To propose and to develop a new Instrumentation and Radioactive Source **Data Management** process





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Project Status Update

Radiation Protection Awareness Online Training

Radiation protection training objectives:

- To develop a course for workers engaged in Agency facilities and activities with radiation sources and nuclear material;
- To raise awareness of
 - the basic science of radiation and radioactive materials and the biological effects of radiation exposure;
 - radiation dose limits, how radiation dose is measured, and how to limit radiation dose and optimize exposure;
 - different types of basic of hand-held radiation detection survey meters to use in the field and personal protective clothing;
- To understand how to respond to radiation and contamination incidents on IAEA premises and during duty travel.

Radiation protection training for occupationally exposed workers (OEWs)

The course provides consistent radiation protection training for IAEA OEWs

- Available online, on IAEA's Learning Management System
- Reviewed and endorsed by informal expert group of radiation protection professionals at IAEA
- Two course offerings available:
 - **For IAEA Staff (general)**
 - **Safeguards Staff on Duty Travel**
- Both offerings include the same seven core modules
- Training for Safeguards Staff on Duty Travel includes two additional modules



Online course for IAEA Radiation Protection Officers (RPOs)

- Develop online training course for IAEA RPOs
- Provide consistent approach for training
- Improved knowledge of roles and responsibilities and radiation safety

Instructional videos for radiation monitoring equipment

- Provision of instructional videos for Agency-wide use
- Improved understanding of the equipment and proper use

Continual improvement of the Radiation Protection Training Course for OEWs



Opportunities for US support



- Provision of Cost-Free Experts, funding of Consultants and Junior Professional Officers to assist with training courses and instructional videos
- Continued funding to develop additional training materials



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3rd International Conference on Occupational Radiation Protection

NORM X Symposium

3rd International Conference on Occupational Radiation Protection

Strengthening Radiation Protection of Workers—Twenty Year of Progress and the Way Forward



5 – 9 September 2022 – Geneva, Switzerland

Organised by the **International Atomic Energy Agency (IAEA)**

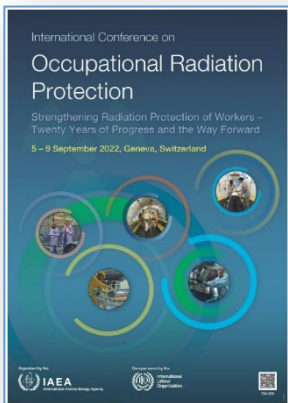
Hosted by the **Government of Switzerland**

Co-sponsored by the **International Labour Organization (ILO)**

In cooperation with the:

European Commission (EC)
European Organization for Nuclear Research (CERN)
Ibero-American Forum of Radiological and Nuclear
Regulatory Agencies (FORO)
International Committee for Non-Destructive Testing
(ICNDT)
International Commission on Radiation Units and
Measurements (ICRU)
International Commission on Radiological Protection
(ICRP)
International Organization of Employers (IOE)
International Radiation Protection Association (IRPA)

International Society of Radiology (ISR)
International Society of Radiographers and
Radiological Technologists (ISRRT)
International Trade Union Confederation (ITUC)
Nuclear Energy Agency of the Organization for
Economic Co-operation and
Development (OECD/NEA)
Pan American Health Organization (PAHO)
United Nations Scientific Committee on the Effects of
Atomic Radiation (UNSCEAR)
World Health Organization (WHO)
World Nuclear Association (WNA)





- The International NORM X symposium , organized from 9 to 13 May 2022 in Utrecht, the Netherlands.
- The theme was

25 years of NORM Symposia Future: Residues Applied in a Circular Economy



Ghana Atomic Energy Commission (GAEC)
in collaboration with
Ghana Association for Radiation Protection (GARP)
and Africa ALARA Network (AFAN)

NORM XI
2025 Accra, Ghana



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Project Status Update

**Ensuring long-term competence in
radiation and waste through E-learning
and other online resources**

Consolidated IAEA project: “Ensuring Long-Term Competence in Radiation and Waste Safety through E-Learning and Other Online Resources”



Contains the following **several sub-projects on occupational radiation protection**, where continued support will be appreciated:

1. Strengthening operation of the Information System On Occupational Exposure In Medicine, Industry And Research (ISEMIR) – ISEMIR-IR, ISEMIR-IC, ISEMIR-N
2. SAFRON
3. RADCULMED
4. SAFEMED



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

Strengthening operation of the Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR)



Track record:

1. Project has been supported by the U.S. since 2009
2. Online information system for promoting radiation protection optimization in medicine, industry and research, formally released in 2017
3. Three modules have been developed and are under routine operation specific topical areas:
 - Industrial radiography: ISEMIR IR
 - Interventional cardiology: ISEMIR IC
 - Industrial process involving NORM: ISEMIR N
4. Two TECDOCs published

What are the objectives?

- improve occupational radiation protection
- facilitate the implementation of ALARA practices and effective exposure management
- efficient collection and maintenance of data on occupational exposure and radiation practices
- analysis of occupational doses of individuals in IR
- benchmarking individual performances against global or regional data
- defining follow-up actions to address identified gaps and disseminate lessons learnt



Strengthening operation of the Information System on Occupational Exposure in Medicine, Industry and Research (ISEMIR)

Current work and future plans:

1. Third Global survey on ISEMIR-IR conducted and the report released
2. Strengthen the operational mechanism, introduction of the National Contact Persons system
3. upgrade of the online database to improve the interface and to expand the ISEMIR system to a multilingual system
4. Improve utilization of ISEMIR-IC through the technical meeting on radiation protection in fluoroscopy guided interventional procedures and promotion in international and national meetings



Improving information about staff doses in interventional cardiology (ISEMIR-IC)

Current status:

- Unresolved issues in IC – insufficient compliance with individual monitoring; insufficient radiation protection training, irregular or no use of protective devices.
- Reporting to ISEMIR-IC insufficient
- Technical meeting was held on radiation protection in fluoroscopy guided Interventional procedures in 2022, with a pre-meeting survey

Future plans:

- Promotion during international and national meetings
- Possible linking ISEMIR-IC to SAFRAD (Safety in Radiological Procedures) database and their parallel development and promotion: single registration, single facility coordinators (typically their RPO or medical physicist), common facility information
- IAEA study on tissue reactions in fluoroscopy guided interventional procedures ongoing, with more than 55,000 procedures included

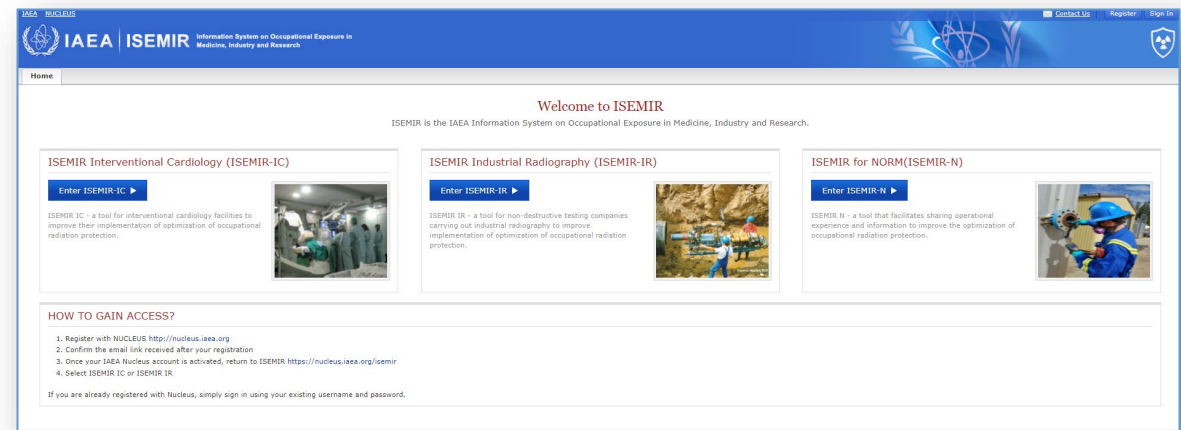


Enhancing radiation protection of workers in NORM industries (ISEMIR-N)



Track record, current work and future plans:

1. Project has been supported by the U.S. since 2019
2. Extension with ISEMIR-N
3. Intention is to create a module under ISEMIR, an online information system for radiation protection optimization in industrial processes involving NORM
4. Global survey conducted
5. Technical meeting planned in November 2021 to collect feedback for design and promote the use of the system in the Member States
6. **Online database formally released on 14 June 2022**



Consolidated IAEA project: “Ensuring Long-Term Competence in Radiation and Waste Safety Through E-Learning and Other Online Resources”

Three sub-projects on radiation protection and safety in medical uses of radiation where continued support will be appreciated:

1. Implementation of the Safety in Radiation Oncology System for the support of safe use of therapeutic medical radiation technology – SAFRON Incident Learning System
2. Implementation of the Strengthening of Radiation Safety Culture in Medicine (RADCULMED)
3. Implementation of the Specific Safety Guide on Radiation Protection and Safety in Medical Uses of Ionizing Radiation (SAFEMED)



One of **seven eLearning Courses** which have attracted more than 29,000 users to date.

Implementing the Safety in Radiation Oncology System for the Support of Safe Use of Therapeutic Medical Radiation Technology (SAFRON)



- Project has been **supported by the U.S.** since 2009.
- International voluntary and anonymized Incident Learning System (ILS) for external beam radiotherapy, brachytherapy and therapeutic nuclear medicine has been created in the project.
- More than **1700 incidents and near misses** shared through SAFRON since the launch on 12/12/2012, for supporting learning globally.
- Re-launched in August 2022 with new user-interface, new analysis capabilities and **mobile phone version**.
- Peer reviewed paper: “Safety in radiation oncology (SAFRON): Learning about incident causes and safety barriers in external beam radiotherapy” Phys Med. 2023 Jul;111:102618. doi: 10.1016/j.ejmp.2023.102618. Epub 2023 Jun 11.



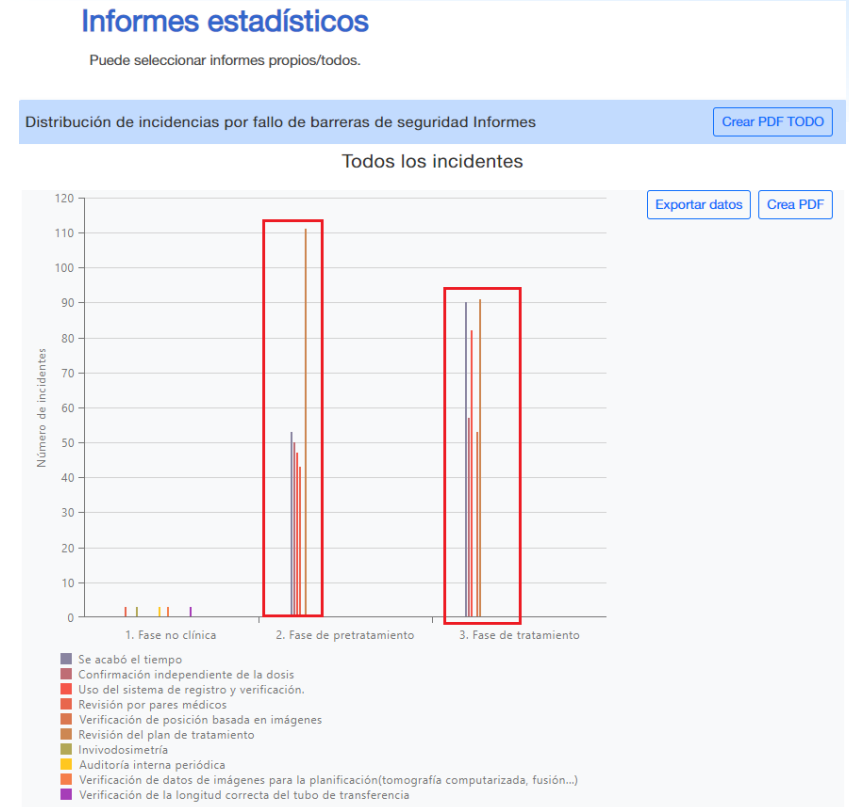
<https://rpop.iaea.org/SAFRON/>

Implementing the Safety in Radiation Oncology System for the Support of Safe Use of Therapeutic Medical Radiation Technology (SAFRON)



Future plans:

1. Expand the SAFRON incident learning system to the **other official IAEA languages (Spanish and French)**.
2. More **promotion** and more focussed **analysis** including peer-reviewed papers.



Testing the upcoming Spanish version of SAFRON

Implementing the Strengthening of Radiation Safety Culture in Medicine (RADCULMED)

Track record, current work and plans:

1. Project has been **supported by the U.S.** since 2017
2. Intention is to create course training and assessment material to support Member States in strengthening radiation safety culture in medicine
3. A **handbook was created:** “Radiation Safety Culture Trait Talks” structured around 10 important principles – traits – that contribute to a strong safety culture
4. Many **digital presentations** on how medical facilities address improvements in safety culture in practice complementing handbook – received through **competition** among health professionals
5. Delivery of **workshops** in different regions is being planned, commencing with Morocco in Nov’23



Implementation of the Specific Safety Guide on Radiation Protection and Safety in Medical Uses of Ionizing Radiation (SAFEMED)



Track record, current work and plans:

1. Project has been **supported by the U.S.** since 2019
2. Intention is to support implementation in Member States of the **Specific Safety Guide No. SSG 46** on Radiation Protection and Safety in Medical Uses of Ionizing Radiation
3. New **eLearning packages** launched on diagnostic reference levels in diagnostic imaging; radiation protection for dentists; and radiation protection in fluoroscopy guided interventional procedures; and other electronic **guidance material**
4. IAEA major conference approved for 8-12 Dec 2025 in Vienna: **International Conference on Radiation Protection in Medicine: X Ray Vision**



Platform for outreach; guidance; eLearning, etc.
> 1,000,000 visits per year

<https://www.iaea.org/resources/rpop>

International Conference on Radiation Protection in Medicine: X Ray Vision

2025 4th Quarter

Objectives and scope



Objectives:

- To review the overall implementation of the Bonn Call for Action in the years since it was launched
- To review new developments in all major medical applications of radiation in medicine impacting on radiation protection of patients, health professionals and public
- Look ahead at future challenges and opportunities in this topical area

Scope:

- Radiation protection in medicine, including optimization of radiation protection and safety in medicine, and justification of medical exposures
- Safety in medical uses of radiation, and also radiation protection of medical workers and public when ionizing radiation is used for diagnosis, interventions, therapy and research



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Project Status Update

Establishment & Maintenance of National Dose Registries

Ongoing support: dose registry



- IAEA requires recording occupational exposures, and so many countries have developed a national software to record and maintain the occupational exposures.
- A software named “National Dose Registry” (NDR) was developed, in Spanish, following the experience in Cuba and Brazil and with the support of TC projects RLA9066 and RLA9075, to facilitate the implementation of the requirement.
- It was proposed to use the NDR software to harmonize and centralize the information in LATAM, with possible uses for optimizing the occupational doses in the region.
- An initial web-based version of the NDR in English was presented and discussed in regional workshops in Asia and Pacific and Africa regions (under TC projects RAS9080 and RAF9057). The feedback received was very positive.
- The description of the prototype was published in August 2021.
- There is a proposal to consider setting up regional registries of the doses using the NDR system.
- Additional work is needed to finalize the translation, verify and validate the new English version and to support its implementation in the different regions.

Funding needed for:

- Upgrading the web platform for improving the capabilities to assist the regions (50,000 US\$)
- Uploading the English version, finalize the translation, verification and validation of the new NDR tool (30,000 US\$)
- Support the development of a LATAM and CARIBE registry using NDR (10,000 US\$)
- Preparing a training course for the NDR in English (10,000 US\$)


 The NDR has been designed, developed, and validated. So far, Sixteen Countries have started to implement the National Dose Registry (NDR).



NDR

Spanish Version

1 - BRAZIL

2 - CUBA

16 COUNTRIES

- 3. Nicaragua
- 4. Paraguay
- 5. Peru
- 6. Ecuador
- 7. Colombia
- 8. Guatemala
- 9. Venezuela
- 10. Uruguay
- 11. Bolivia
- 12. Honduras
- 13. Costa Rica
- 14. Chile
- 15. El Salvador
- 16. Mexico



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Project Status Update

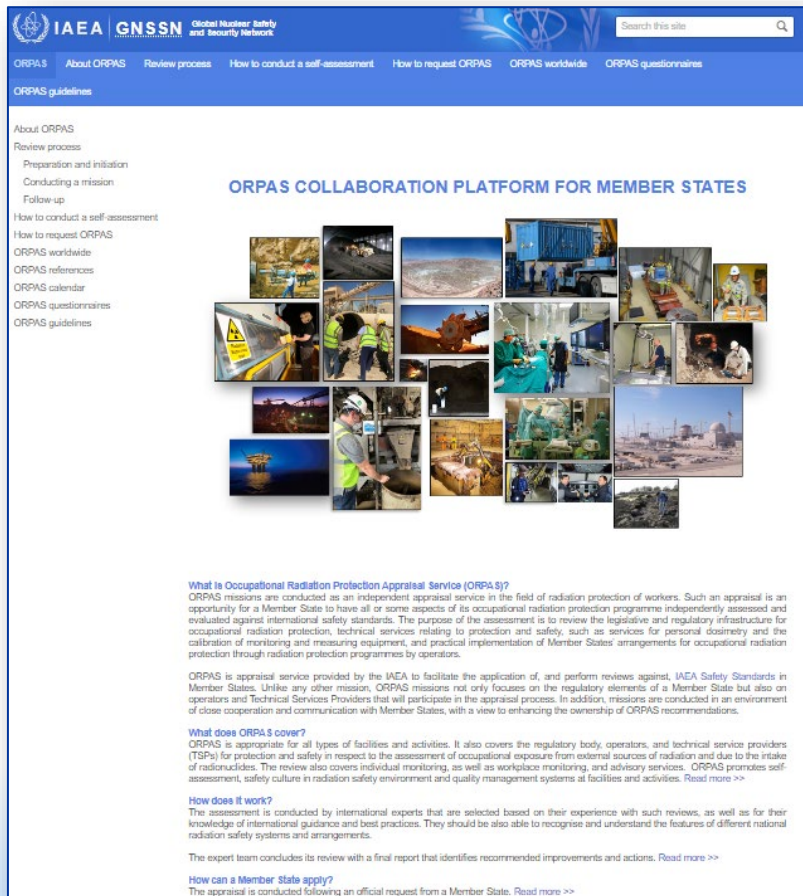
**Enhancing Radiation Protection of Workers
through the Occupational Radiation
Protection Appraisal Service (ORPAS) in the
Member States**

ORPAS - Independent appraisal



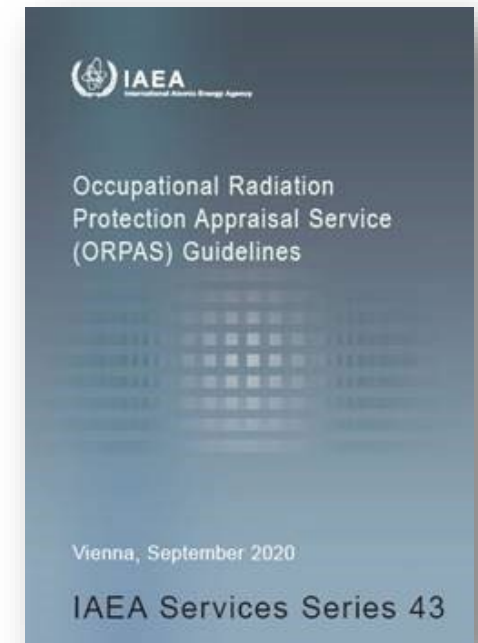
- ORPAS provides a cross-cutting review, against the relevant IAEA safety standards (mainly GSR Part 3 & GSG-7 and GSR Part 1/4), of the regulatory framework for ORP and the application of the requirements at all facilities and activities utilising radiation technologies in the host State.
- Provides an opportunity for a MS to have its ORP program independently assessed and evaluated
 - As a part of ORPAS preparation, MS is encouraged to complete the self-assessment in the form of questions (ORPAS questionnaire) tailored to the three set of participants involved in an ORPAS mission
 - Preparation and data collection (review material) through specific Questionnaires, Self-assessment of Regulatory Infrastructure for Safety (SARIS) (& RASIMS TSA 2)
- ORPAS database has been developed (information exchange platform)
 - Planning and assessment tool
 - Statistics analysis capacity in implementing recommendations and suggestions and in identify the strengths and weaknesses of host country





The screenshot shows the website for the ORPAS Collaboration Platform. The header includes the IAEA logo, the GNSN (Global Nuclear Safety and Security Network) logo, and the text "Global Nuclear Safety and Security Network". A search bar is located in the top right corner. The main navigation menu includes links for "ORPAS", "About ORPAS", "Review process", "How to conduct a self-assessment", "How to request ORPAS", "ORPAS worldwide", and "ORPAS questionnaires". The main content area is titled "ORPAS COLLABORATION PLATFORM FOR MEMBER STATES" and features a collage of images showing various industrial and laboratory settings. Below the collage, there are several sections of text providing information about ORPAS, including its purpose, the services it provides, and how it works.

- All necessary information
- Review process
- How to request
- How to conduct self –assessment
- Calendar
- Worldwide ORPAS
- References
- Questionnaires
- List of completed missions
- Guidelines



Current status of implementation

Slovak Republic	• Mission	• Q2 2022
Nigeria	• Mission	• Q3 2022
Philippines	• Mission	• Q4 2022
United Arab Emirates	• Follow-up Mission	• Q4 2022
Peru	• Follow-up mission	• Q4 2022
Morocco	• Follow-up Mission	• Q4 2022
Costa Rica	• Follow-up mission	• Q4 2022
Botswana	• Mission	• Q4 2023
Kenya	• Mission	• Q1 2024
Thailand	• Mission	• Q1 2024

– ORPAS Extrabudgetary funding is crucial for proper implementation



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Project Status Update

**Strengthening Safety Assessment, Optimization
and promotion of Safety Culture in the
Organizations, Facilities and Activities**

Developing and strengthening the safety assessment methodology and its tool kit for safety assessment (TOKSA) for medical and industrial applications



- Specific **document** on implementation of safety assessment methodologies in industrial and medical applications based on risk matrix (RM) and failure modes and effects analysis (FMEA) starting with industrial radiography and medical applications.
- A **tool kit for safety assessment (TOKSA)** facilitating the implementation of the 24 requirements of GSR Part 4.
- **Self-assessment tool** for evaluating safety assessment.
- Development of a **regional network** on safety training packages on safety assessment for radiation protection officers and senior managers of radiation facilities

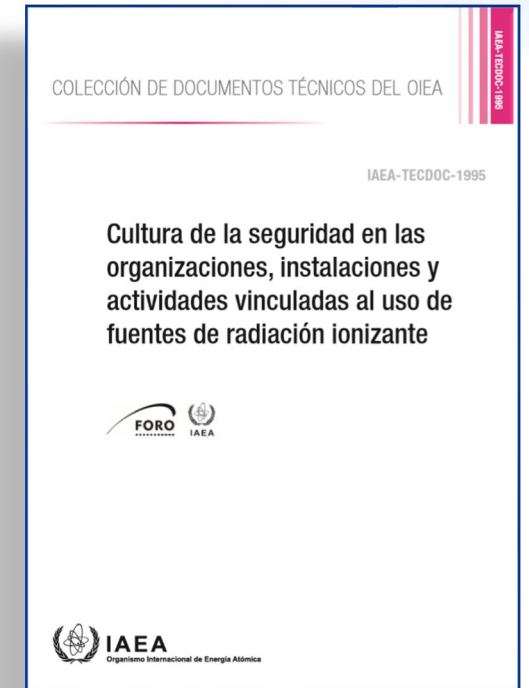
- **TOKSA** - tool to implement prospective risk analysis methods and safety assessment to enhance safety in medical and industrial applications based on GSR Part 4.
- Setting the latest standards for shielding and numerical dosimetry applications by means of MCNP:
 - ❑ Establish a **network of end-users** on Spanish-speaking countries with access to MCNP.
 - ❑ Create and test a set of IAEA **training courses** for shielding and numerical dosimetry applications (in Spanish) supported by MCNP.
 - ❑ **Record the training courses** and establish them in an IAEA e-learning platform.

<http://radioterapia.tk4sa.com/login.php>

<http://industria.tk4sa.com/login.php>

Strengthening safety culture in the organizations, facilities and activities in industrial radiography and other applications

- Regional **survey** on safety culture in the area of radiation facilities.
- Specific **document** on implementation of safety culture attributes in industrial radiography
- **Self-assessment tool** for evaluating safety culture attributes.
- Designing **audio-visual aids** on selected radiological accidents and incidents from the safety culture perspective.
- Development of a **regional network** on safety culture.
- **Leadership training** in safety culture for senior managers of radiation facilities
- **Peer review** (benchmarking) of national programs to foster and develop safety culture in medical and industrial practices using radiation sources.



New proposals for attracting US extra-budgetary funding



1. Developing and strengthening the safety assessment methodology and IT tool for safety assessment (TOKSA) for medical and industrial applications.
2. Global survey and web-based database on technical services.
3. Strengthening safety culture in the organizations, facilities and activities in industrial radiography and other applications.
4. Setting the latest standards for shielding and numerical dosimetry applications by means of MCNP.



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Project Status Update

**Cooperation with Fukushima
Prefecture in the area of radiation
monitoring and remediation**

Cooperation between the International Atomic Energy Agency (IAEA) and Fukushima Prefecture



To support ongoing protection of people and the environment from ionizing radiation in Fukushima Prefecture after the accident at TEPCO's Fukushima Daiichi Nuclear Power Plant in March 2011, the IAEA provided assistance under the framework of cooperation with Fukushima Prefecture in three areas:



Radiation monitoring & mapping

- including the application of environmental mapping technology by using unmanned aerial vehicles, and using radiation monitoring data to develop maps to be made available to the public

Remediation & decontamination

- Off-site decontamination, including in analyses of environmental monitoring results and the exploration of exposure pathways so as to reduce or avoid exposure

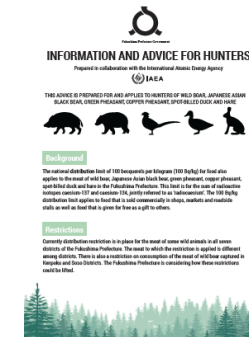
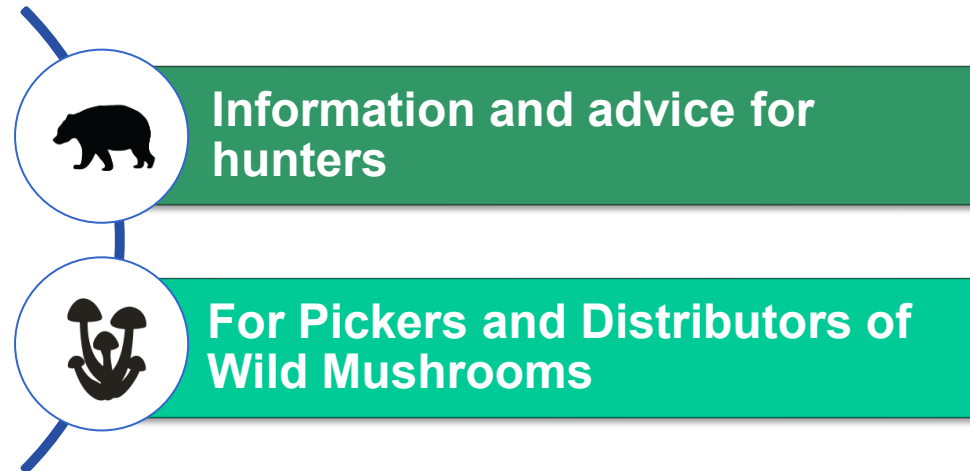
Management of radioactive waste

- The management of radioactive waste and on management methods of low-level radioactive waste from off-site decontamination activities

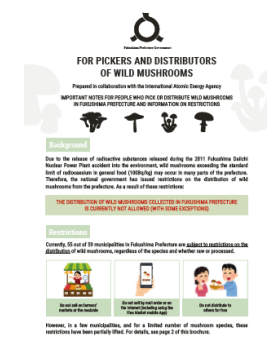


Dissemination of information on the areas of work under the IAEA and Fukushima Prefecture cooperation

- The IAEA assists Fukushima Prefecture on the dissemination of information on the areas of work under the cooperation on radiation monitoring and remediation. This includes the preparation and publication of information materials for its citizens on radiation such as:



Brochure for Pickers and Distributors of Wild Mushrooms (JP/EN)



Brochure on Information and Advice for Hunters (JP/EN)

- The IAEA assists the Technical report on safety assessment of Temporary Storage Sites (TSS):**
 - Phase 1: for the period while waste was stored in the TSS
 - Phase 2: for the period after the waste was transported out from the TSS(Available on the IAEA and Fukushima Prefecture websites)

The IAEA and Fukushima Prefecture cooperation has:

- Concluded a project on the application of environmental mapping technology and the use of radiation monitoring data to develop maps for public
- Prepared reports on the cooperation activities, describing the progress of projects dealing with the movement of radioactivity in forests and wild animals; decontamination strategies for rivers and lakes; management methods of low-level waste produced during decontamination activities
- Released four mid-term reports in April 2021, which document the developments in the implementation of the Practical Arrangements between 2013 and 2020
- A Summary Workshop held in Fukushima in early 2023
- There is a plan to extend the cooperation for additional 5 years



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Project Status Update

Communication on Radiation Safety: Radiation Safety Navigator

Communication on radiation safety: Radiation Safety Navigator

An interactive **online platform** for professionals responsible for communicating radiation safety, related risks and radiation protection measures such as those employed by regulatory bodies, operators, and radiation protection community from all Member States.




The main goals of the Navigator are to:

- strengthen and harmonize radiation protection communication;
- enable radiation protection terminology to become more accessible and better understood by providing extended explanations based on the IAEA safety standards;
- provide hands-on guidance in communication of radiation protection information to Member States, with a focus on online communication;
- share and collect best practices from the IAEA and Member States and tips for a content creation with examples.



How does it work?

- Accessible through IAEA Open Learning Management System (CLP4NET)
- Self-study course
- Six topical areas:
 - radiation and radioactive decay;
 - radiation dose and radiation effect;
 - quantities and units;
 - sources of radiation;
 - radiation protection;
 - radon.
- Certificate after completion

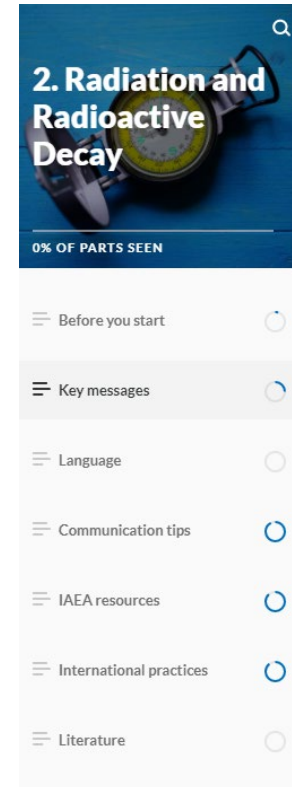


The screenshot shows the IAEA Learning Management System interface. The header includes the IAEA logo, the text 'IAEA | Learning Management System powered by CLP4NET', and a user profile for 'Natalia IVANOVA'. Below the header, there are navigation links for 'OPEN-LMS' and 'English (en)'. The main content area displays the course title 'Navigator in Radiation Safety Communication' and a banner image with the text 'RADIATION SAFETY NAVIGATOR'. Below the banner, there is a 'Welcome to Radiation Safety Navigator!' section with a 'What is the Navigator?' heading and a paragraph describing the course. There is also a 'Who can benefit from it?' section with a heading and a paragraph.

<https://elearning.iaea.org/m2/enroll/index.php?id=867>

It contains:

- Key messages
- Language
- Communication tips
- IAEA resources
- International practices
- Literature



- **TECDOC** “Radiation Safety Navigator: Online Methods and Tools of Communication” (in preparation)
- Add **new topics** to the online platform:
 - Non-medical human imagining
 - Food and drinking water
 - Consumer products
 - Environment
- Extra-budgetary funding for consultancies is needed to develop new modules with topics mentioned above.



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Thank you