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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, EPRéSC

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2. BACKGROUND

The concept of existing exposures situation was introduced by the International Commission on Radiological Protection (ICRP) Publication 103 as those type of exposure resulting from sources, natural or man-made, that already exist when a decision on control needs to be taken. It includes a very wide range of exposures arising from radon, naturally occurring radioactive material, cosmic radiation, and from areas contaminated by past practices or as a result of a nuclear or radiological emergency.

The requirements for existing exposure situations are set out in section 5 of GSR Part 3: Radiation Protection and Safety: of Radiation Sources: International Basic Safety Standards. These include six overarching Requirements:

Requirement 47: Responsibilities of the Government specific to existing exposure situations

Requirement 48: Justification for protective actions and optimization of protection and safety

Requirement 49: Responsibilities for remediation of areas with residual radioactive material

Requirement 50: Public exposure due to radon indoors

Requirement 51: Exposure due to radionuclides in commodities

Requirement 52: Exposure in workplaces.

Several Safety Guides have been developed and published (see Section 6 of this DPP) that provide recommendations on implementing the above requirements on specific types of existing exposure situation. GSG-15: Remediation Strategies and Processes for Areas affected by Past Activities or Events provides recommendations in relation to Requirements 47, 48, 49, 51 and 52. SSG-32: Protection of the Public against Exposure Indoors due to Radon and other natural Sources of Radiation, provides recommendations in relation to Requirement 50 and 51 (building materials). GSG-8: Radiation Protection of the Public and the Environment provides general recommendations for planned, emergency and existing exposure situations, and includes some specific recommendations in relation to Requirement 51 (food, drinking water). GSG-7: Occupational Radiation Protection and DS519: Protection of Workers against Exposure due to Radon provide recommendations in relation to Requirement 52; and DS538 provides recommendations in relation to Requirements 47, 48, 49, 51 and 52 for post-remediation activities.

Additionally, the IAEA has published or is developing Safety Reports and TECDOCs that provide practical examples and detailed analysis of specific types of existing exposure situation as detailed in Section 6 of this DPP.

Acknowledging the above-mentioned recommendations and guidance on existing exposures situations, either published or in the pipeline, Member States have expressed through their representatives at RASSC and WASSC the need for an additional general guidance applicable to all existing exposure situations. RASSC at its meeting held in June 2021 requested the preparation of an overarching guidance on existing exposure situations, which was subsequently supported by WASSC during a joint session with RASSC in October 2021 (Outcome RW3).

A potential scope of the guidance was initially identified by RASSC through the work of an electronic working group (eWG) in 2021. The eWG prepared a questionnaire for RASSC members to obtain feedback from RASSC of the types of existing exposure situations that have been identified in Member States, the main challenges in their management and on whether there was a need for further guidance to assist Member States in the application of the requirements on existing exposure situations in Member States.

The challenges identified by the eWG are presented in Annex 1 to this DPP.

The RASSC eWG scope recommended that there was a need for further general guidance namely on the following topics: identification of existing exposure situations, graded approach to regulatory control and how to apply it, protection strategies, communication on need to regulate such situations, interaction/coordination between different national authorities and setting reference levels.

Following this, a consultancy meeting was held from 4-6 May 2022 to prepare a DPP for the proposed Safety Guide. The experts at the consultancy meeting carried out a review and an initial gap analysis of the content of the existing Safety Guides relating to existing exposure situations. A copy of the “Review of Documents and Initial Gap Analysis” carried out by the experts at the consultancy meeting is attached as Annex 2 to this DPP. The experts also reviewed and adapted the list of challenges identified by the RASSC working group that is presented in Annex 1.

3. JUSTIFICATION FOR THE PRODUCTION OF THE PUBLICATION

The review of the published Safety Guides that deal with specific types of existing exposure situations covering the requirements for existing exposure situations in GSR Part 3 has identified gaps in their content in relation to Requirements 47 and 48, and paras 5.1–5.9 of GSR Part 3 for existing exposure situations.

There are currently 11 Safety Guides that have been published or are under development relating to existing exposure situations. While Requirements 47 and 48, and paras 5.1–5.9 of GSR Part 3 have been dealt with in two of these Safety Guides, it is considered preferable to develop a new General Safety Guide rather than revising relevant existing Safety Guides.

It is therefore proposed to develop a General Safety Guide covering radiation protection and safety aspects in existing exposure situations that is applicable to all types of existing exposure situations.

It is noted that Section 5 of GSR Part 3 on Existing Exposure Situations was a new section introduced in the revision of the International Basic Safety Standards that was published in 2014. The identification and management of what is an “existing exposure situation” is not fully understood in many Member States, and RASSC and WASSC have both identified the need for a General Safety Guide.

4. OBJECTIVE

The objective of the proposed General Safety Guide is to provide general recommendations on implementing the requirements of GSR Part 3 in relation to radiation protection and safety of the public, workers and the environment in all existing exposure situations. The aim is to support consistency in the scope and management of the varied range of existing exposure situations across Member States acknowledging the prevailing circumstances influencing their management.

The General Safety Guide is intended for use by regulatory bodies and other relevant authorities which are responsible for establishing regulatory requirements and guidance, and, where applicable, by operating organizations and other relevant organizations responsible for protection and safety in managing existing exposure situations.

5. SCOPE

The Safety Guide will provide recommendations that apply to all existing exposure situations that could occur in Member States as described in Section 5 of GSR Part 3.

The Safety Guide will cover the protection of the public, workers and the environment.

This Safety Guide will not duplicate those recommendations provided in detail on specific topics under the existing exposure situations such as GSG-15, SSG-32 and other guidance as described in Section 6 (such as GSG-6, GSG-7, GSG-8 and GSG-13) but will provide necessary reference and contexts in the overall framework.

6. PLACE IN THE OVERALL STRUCTURE OF THE RELEVANT SERIES AND INTERFACES WITH EXISTING AND/OR PLANNED PUBLICATIONS

The requirements for existing exposure situations are set out in section 5 of GSR Part 3: Radiation Protection and Safety: of Radiation Sources: International Basic Safety Standards. In particular, the Safety Guide would provide recommendations on the implementation of the requirements established in paras 5.2–5.9 of GSR Part 3.

Recommendations on specific requirements of Section 5 of GSR Part 3 are provided in Safety Guides that are applicable to specific types of existing exposure situations. The gap analysis (see Annex 2) has shown that while the Safety Guides listed below address specific aspects relevant for existing exposure situations, there is a need for a single guide that applies to all types of existing exposure situations and addresses the protection of the public, workers and the environment.

1. Remediation of contaminated sites (GSR Part 3, paras. 5.10-5.18):
 - i. GSG-15: Remediation Strategies and Processes for Areas Affected by Past Activities or Events
 - ii. DS538: Long Term post remediation management of areas affected by past activities or events
2. Radon in dwellings (GSR Part 3, paras 5.19-5.21):
 - i. SSG-32: Protection of the Public against Exposure Indoors due to Radon and other Natural Sources of Radiation
3. Commodities (paras. 5.22-5.23)
 - i. GSG-8: Radiation Protection of the Public and the Environment
 - ii. SSG-32 (construction materials): Protection of the Public against Exposure Indoors due to Radon and other Natural Sources of Radiation
 - iii. GSG-15: Remediation Strategies and Processes for Areas Affected by Past Activities or Events

- iv. SSG-60: Management of Residues Containing Naturally Occurring Radioactive Material from Uranium Production and Other Activities.
 - v. DS358: Long Term post remediation management of areas affected by past activities or events
4. Workplaces (paras 5.24-5.33):
- i. GSG-7: Occupational Radiation Protection
 - ii. DS519: Protection of Workers against Exposure due to Radon
5. Responsibilities of the government and regulatory body (para. 5.3-5.8):
- i. GSG-44: Establishing the Infrastructure for Radiation Safety
 - ii. GSG-13: Functions and Processes of the Regulatory Body for Safety
 - iii. DS499: Application of the concept of Exemption
 - iv. DS500: Application of the concept of Clearance
 - v. GSG-6: Communication and Consultation with Interested Parties by the Regulatory Body.
 - vi. SSG-60: Management of Residues Containing Naturally Occurring Radioactive Material from Uranium Production and Other Activities.
6. Protection Strategies during emergency situations and transition from an emergency to an existing exposure situation (GSR Part 3 and GSR Part 7)
- i. GSG-11 Arrangements for the Termination of a Nuclear or Radiological Emergency
 - ii. GSG-2 Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency
 - iii. DS534 Protection Strategy for a Nuclear or Radiological Emergency

The IAEA has published or is developing Safety Reports and TECDOCs that provide practical examples and detailed analysis of specific types of existing exposure situation.

1. Remediation of contaminated sites:
- i. Safety Report No. 72: Monitoring for Compliance with Remediation Criteria for Sites
 - ii. Safety Report: under development – Living and Working in Long-Term Contaminated Environments
 - iii. TECDOC 1660: Exposure of Public from Large Deposits of Mineral Residues
2. Radon in dwellings
- i. Safety Report Series No. 98: Design and Conduct of Indoor Radon Surveys
 - ii. TECDOC 1951: Protection against Exposure to Radon Indoors and Gamma Radiation from Construction Materials – Methods of Prevention and Mitigation
3. Commodities
- i. Safety Report Series No. 114: Exposure due to Radionuclides in Food other than during a Nuclear or Radiological Emergency, Part 1 – Technical Material
 - ii. Safety Report Series No. 117: Regulatory Control of Exposure due to Radionuclides in Building Materials and Construction Materials
 - iii. TECDOC 1788: Criteria for Radionuclide Activity Concentrations for Food and Drinking Water

- iv. TECDOC 1951: Protection against Exposure to Radon Indoors and Gamma Radiation from Construction Materials – Methods of Prevention and Mitigation
 - v. TECDOC 2011: Exposure due to Radionuclides in Food other than during a Nuclear or Radiological Emergency, Part 2 – Considerations in Implementing Requirement 51 of IAEA General Safety Requirements Part 3
4. Workplaces, including Industries mining or processing NORM:
- i. Safety Report Series No. 34: Radiation Protection and the Management of Radioactive Waste in the Oil and Gas Industries
 - ii. Safety Report Series No. 49: Assessing the Need for Radiation Protection Management in Industries Involving Minerals and Raw Materials
 - iii. Safety Report Series No. 51: Radiation Protection and NORM Residues Management in the Zircon and Zirconia Industries
 - iv. Safety Report Series No. 68: Radiation Protection and NORM Residues Management in the Production of Rare Earths from Thorium Containing Minerals
 - v. Safety Report Series No. 76: Radiation Protection and NORM Residues Management in the Titanium Dioxide and Related Industries
 - vi. Safety Report Series No. 78: Radiation Protection and NORM Residues Management in the Phosphate Industry
5. Responsibilities of the government and regulatory body
- i. Safety Report: under development – Trade in Commodities
6. Protection Strategies during emergency situations and transition from an emergency to an existing exposure situation (GSR Part 3 and GSR Part 7)
- i. EPR-Series publication on ‘Considerations in the Development of a Protection Strategy for a Nuclear or Radiological Emergency’

The proposed Safety Guide will interface with all of the above listed Safety Guides and Safety Report and TECDOC series.

7. OVERVIEW

A proposed Table of Contents has been developed for the Safety Guide.

It is proposed that the Safety Guide provides general recommendations on how to implement requirements applicable to existing exposure situations that are applicable to all types of existing exposure situations (remediation of contaminated sites, radon in dwellings, commodities such as food, drinking water and construction materials, among others, radon in workplaces, aircrew, space crew).

TABLE OF CONTENT

1. Introduction
2. Identification of existing exposure situations
3. Responsibilities of Regulatory Bodies, other relevant Authorities, operating organization and other relevant organizations
4. Establishing Reference Levels
5. Provisions for the management of existing exposure situations in the Legal and Regulatory Framework
6. Establishment of National Protection Strategies

7. Protection of public, workers and the environment in existing exposures situations
8. Application of graded approach
9. Justification for protective and remedial 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

This section will include examples of how to apply the recommendations in practice. Examples to be considered include for instance:

Annex A: Example of application of graded approach in existing exposure situations.

Annex B: Example of selection of reference levels in existing exposure situations

Annex C: Example of characterization in existing exposure situations.

Annex D: Example of safety assessment in existing exposure situations.

Annex E: Example of communicating and raising awareness

The World Health Organization has expressed an interest to co-sponsor the Safety Guide. The International Labour Organization and the United Nations Environment Programme will be invited to co-sponsor the Safety Guide.

8. PRODUCTION SCHEDULE: A provisional schedule for preparation of the document is presented hereinafter:

STEP 1: Preparing a DPP	DONE
STEP 2: Approval of DPP by the Coordination Committee	August 2022
STEP 3: Approval of DPP by the relevant review Committees	November 2022
STEP 4: Approval of DPP by the CSS	April 2023
STEP 5: Preparing the draft Indicate as to whether a TM is expected to be organized for the preparation of the draft	2023, 2024 TM end 2024
STEP 6: Approval of draft by the Coordination Committee	March 2025
STEP 7: Approval by the relevant review Committees for submission to Member States for comments	June 2025
STEP 8: Soliciting comments by Member States	July-November 2025
STEP 9: Addressing comments by Member States	March 2026
STEP 10: Approval of the revised draft by the Coordination Committee Review in NSOC-SGDS (Technical Editorial review)	July 2026
STEP 11: Approval by the relevant review Committees	April 2027
STEP 12: - Submission to the CSS - Submission in parallel and approval by the Publications Committee - MTCD Editing - Endorsement of the edited version by the CSS	October 2027
STEP 13: Establishment by the Board of Governors (for SF and SR only))	n/a
STEP 14: Target publication date	2028

9. RESOURCES

50 person weeks

6 Consultancy meetings

Four Regional Workshops

1 Technical Meeting

ANNEX 1

Challenges identified by RASSC

RASSC identified the main challenges in the implementation of the requirements of GSR Part 3 on existing exposure situations to be (list reviewed and modified by the consultancy meeting):

- A consistent approach to the identification and evaluation of existing exposure situations
- Establishing a legal and appropriate regulatory framework, including clarifying what is meant by regulatory control/oversight for each type of existing exposure situations
- National consistent approach to managing existing exposure situations
- Setting and implementing appropriate and consistent reference levels, and the development of practical tools such as screening values
- Interaction/coordination between different national regulatory authorities
- Applying the graded approach to existing exposure situations
- Establishing relevant protection strategies, including self help protection when appropriate
- Justification and optimization of protection strategies, taking into account all hazards
- Communicating/explaining of control of existing exposure situations to raise awareness in public/non-expert groups
- Involvement of responsible and impacted interested parties in the decision-making process

ANNEX 2

Review of Documents and Initial Gap Analysis

The consultancy meeting reviewed the IAEA publications and draft publications relating to providing recommendations and guidance on the implementation of Requirements 47–52 in GSR Part 3 on Existing Exposure Situations.

The meeting identified the following gaps:

1. There is a need for further guidance on the establishment of the regulatory and legal framework for all existing exposure situations, and on overarching regulatory oversight by the regulatory body for radiation safety (Requirement 47). There is some guidance on the content of the regulatory requirements in GSG-15 (Remediation), SSG-32 (Radon in dwellings) and in DS519 (Radon in Workplaces). There is advice on the establishment of regulatory requirements for building materials in the Safety Report Series No. 117.
2. Regarding the establishment of reference levels (Requirement 5.2) Figure 1 in the draft Safety Guide DS499: Application of the Concept of Exemption includes the use of screening values in relation to regulatory control for existing exposure situations. There is little guidance on the concept of regulatory control for existing exposure control in DS499. There are examples of the development of screening values (guideline value, guidance) for food and international trade of non-edible commodities in non-emergency situations.
3. Clarity is required in the terms “screening values”, “guidelines values”, “guidance values”, “protection strategy” and a definition of “commodity” (Requirements 48 and 51).
4. The requirements in GSR Part 3, Section 5, set out some of the functions e.g. establish regulatory and legal framework, establish reference levels, ensure information is available, review safety assessment, approve remedial action plan, review monitoring plans, review work procedures, establish specific reference levels for commodities, establish and enforce requirements for occupational exposure, etc. The Safety Guide GSG-13: Functions and Processes of the Regulatory Body for Safety provides guidance on: Regulations and Guides; Notification and Authorization; Review and Assessment; Inspection; Enforcement; Emergency preparedness and response; and Communication. Para 3.26 (e) of GSG-13 states that the regulatory body is required to establish a regulatory system that includes the regulatory functions relevant to existing exposure situations. However, GSG-13 provides no guidance on these functions.
5. Requirement 48 of GSR Part 3, in particular Paragraph 5.7 establishes that the protection strategy for the management of existing exposure situations, established in accordance with paras 5.2 and 5.4, is commensurate with the radiation risks associated with the existing exposure situation. The gap analysis has shown that there is very little guidance on how to implement the graded approach in existing exposure situations. There is need to develop guidance on the process behind a graded approach for each type of existing exposure situations.
6. Requirement 47 of GSR Part 3 requires the establishment of appropriate reference levels for existing exposure situations. While there is guidance on the establishment of the reference level in GSG-15 (remediation), SSG-32 (radon) and GSG-8, there is a for guidance on the methodology for developing reference levels which applies to all

existing exposures situations. The methodology described in the Australian Radiation Protection Series for Existing Exposure Situations was considered to be a good example. The reference level comes out of the process that includes consultation with interested parties.

7. Requirement 48 in GSR Part 3 requires that justification for protective actions and optimization of protection and safety should be implemented in the light of the prevailing circumstances. The gap analysis has shown that there is no guidance on how to understand “prevailing circumstances”, and the factors or criteria that need to be taken into account, such as political, interested party, social, economic, cultural and communication issues in each of the existing exposures situations.
8. Requirement 47 in GSR Part 3 requires the establishment and implementation of protection strategies. GSG-15 covers protection strategies very well for remediation, and SSG-32 covers the development of radon action plans. However, there is no guidance on the development and implementation of protection strategies applicable to all existing exposures situations.
9. Requirement 47 establishes that the government shall ensure that existing exposure situations that have been identified are evaluated to determine which occupational exposures and public exposures are of concern from the point of view of radiation protection. Other than in the areas of remediation and radon, there is little guidance on the identification, characterization and evaluation of existing exposure situations. The characterization and evaluation are relevant steps in the establishment of an appropriate protection strategy and guidance on how to perform it for all existing exposure situations is needed. GSG-15 uses terms “preliminary” and “detailed” analysis of the existing exposure situations. It is noted DS505 covers monitoring of public and the environment in existing exposure situations.
10. Paragraph 1.21. in GSR part 3 clarifies that the descriptions that are given in para. 1.20 of the three types of exposure situation are not always sufficient to determine unequivocally which type of exposure situation applies for particular circumstances. If Requirement 47 requires the identification of the existing exposures situations, there is no guidance on declaring the end of an existing exposure situations when applicable.
11. The articulation of the concept of protection strategy and the process to determine compliance of drinking water and building materials, for example, with reference levels is not clear. Refer to approach in GSR Part 7 and DS534 regarding consistency with protection strategies in emergency exposure situation (Requirement 47).
12. There is little guidance on how to perform a “safety assessment” in the evaluation of existing exposure situations. Very simple, very conservative models can be used to demonstrate that the situation is below the reference level. However, if the situation is above the reference level, then more refined models will need to be used (paragraphs 5.12, 5.13).
13. There is little guidance on management of in situ waste and unconventional and legacy waste disposal in the context of regulatory oversight of existing exposure situations. GSG-15 covers remediation, including NORM legacy sites, but additional guidance on reuse and recycling (circular economy) needs to be included to take into account current trends (Requirement 49). (to be considered outside of overarching guidance).

14. Generic guidance on how to apply the principles of justification (including justification of regulatory control) and on optimization in all existing exposure situations (Requirement 48) is required. There is some generic guidance in GSG-15.
15. Guidance on all hazard approach is required. Adopt wording from GSR Part 7 in relation to all hazard approach.
16. Protection of the environment is addressed in the introduction of GSR part 3. While there are requirements on protection of the environment have not been included in GSR Part 3, the current trends make necessary to address protection of the environment in the new safety guide in an explicit way.