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1. IDENTIFICATION

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Proposed Title: Release of Sites from Regulatory Control on Termination of Activities in Planned Exposure Situation

Proposed Action: Revision of Safety Guide WS-G-5.1, Release of Sites from Regulatory Control on Termination of Practices (2006)

**Review Committee(s)
or Group:** WASSC, RASSC

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2. BACKGROUND

An increasing number of facilities have come or are coming to the end of their operational lifetimes and are at present being, or are going to be, decommissioned with the intention of removing their sites from regulatory control.

The IAEA Safety Standards Series No. WS-G-5.1, Release of Sites from Regulatory Control on Termination of Practices, covers aspects of relevance to decommissioning, to protection of public and the environment against radiation and to management of radioactive waste from decommissioning. It was published in 2006, the same year in which the IAEA Safety Standards Series No. SF-1, Fundamental Safety Principles, was published, and prior to the publication of most of the current Safety Standards Series publications in the waste safety and radiation safety areas.

Both the key related IAEA General Safety Requirements, namely No. GSR Part 3, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, and No. GSR Part 6, Decommissioning of Facilities, have been published in the meantime in 2014, introducing new concepts and definitions such as the three exposure situations. In addition, two new Specific Safety Guides, Nos. SSG-47, Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities and SSG-49, Decommissioning of Medical, Industrial and Research Facilities have been published in 2018 and 2019, respectively.

Since 2006 many decommissioning projects have been completed or are nearing completion, providing practical experiences on aspects related to release of sites from regulatory control after completion of decommissioning of different types of facilities. Related experiences and lessons learned are at present subject to discussions and analyses within the IAEA-led International Project on Completion of Decommissioning (COMDEC), which started in 2018.

3. JUSTIFICATION FOR THE PRODUCTION OF THE DOCUMENT

WS-G-5.1 was published in 2006, prior to the publication of the GSR Part 6 and the GSR Part 3. Guidance on how to meet the requirements of GSR Part 6 and GSR Part 3 is thus not systematically provided in WS-G-5.1.

WS-G-5.1 references superseded publications such as Safety Series Nos. 111-F and 115, Safety Standards Series Nos. WS-R-5, WS-G-2.1, WS-G-2.2, WS-G-2.4, WS-R-1 and others. The references to these publications and in some cases to specific paragraph numbers do not provide an up-to-date guidance, even when the information from the old publications is preserved in the revised versions.

Consistency of the guidance on release of sites with the recently published Safety Guides SSG-47 and SSG-49 on decommissioning needs to be ensured.

Experiences from Member States on release of sites since 2006 need to be taken into account in the IAEA guidance, they were not available when the WS-G-5.1 was written.

Most of the guidance provided in WS-G-5.1 in general is still applicable, but the level of details needs to be increased. More detailed guidance is needed on aspects such as the definition of a decommissioning end state, development of end state criteria, planning and implementation of a clean-up process to achieve the end state, demonstration of compliance with the end state criteria, regulatory process for release of the site, specific situations where restrictions need to be applied after the site release, involvement of interested parties in different steps of the process, etc.

Certain terminology used in WS-G-5.1 needs to be corrected. For example, it uses the terms ‘practices and interventions’ (the old concepts used prior to the publication of GSR Part 3) and ‘critical group’ (an old concept replaced by the concept of a representative person).

The feedback from international meetings, from the COMDEC project, from the discussions that have taken place in WASSC and RASSC committees and in several consultancy meetings, also indicated the need to revise the Safety Guide WS-G-5.1 in order to address the safety requirements of GSR Part 6 and GSR Part 3 in a systematic manner, to make it fully consistent with recently published safety guides on decommissioning and to provide more detailed guidance on aspects mentioned above. At the 51st WASSC meeting in July 2021, the Committee requested the Secretariat to develop a DPP to revise the Safety Guide WS-G-5.1 (action under agenda item W6.1). The Secretariat further sought guidance from the Committee on what the scope of the revision should be, and the Committee at the 53rd WASSC meeting in June 2022 requested the Secretariat to maintain the original scope of the Safety Guide to develop a DPP for its revision (action under agenda item W3.2).

4. OBJECTIVE

The objective of the revised Safety Guide is to provide guidance on release of sites or parts of sites from regulatory control after facilities that were located on the site have been decommissioned or activities that took place have ceased. Such release from regulatory control may require clean-up of contaminated sites, and this publication will provide guidance to facilitate the clean-up activities and subsequent release from regulatory control for both remaining structures and soils.

The revised Safety Guide will be useful for decommissioning licensees and regulatory bodies in Member States to assist them in applying the GSR Part 6 requirements on the completion of decommissioning and on release of sites from regulatory control, as well as the applicable requirements of the GSR Part 3.

5. SCOPE

The revised Safety Guide will be applicable to sites and areas adjacent to sites that have become contaminated as a result of activities relating to planned exposure situations and that are being

considered for release from regulatory control as part of an overall decommissioning process. Sites may include remaining buildings, underground structures, pipes, etc. All activities that will be covered in this Safety Guide are considered a planned exposure situation and related requirements of the GSR Part 6 and the GSR Part 3 are applicable.

The information presented in this revised Safety Guide will be applicable to sites where facilities that used, manufactured, processed or stored radioactive material were located. The decontamination and dismantling activities related to structures, systems and components of the former facility, performed as part of the decommissioning process, are out of the scope of this Safety Guide. However, when structures are meant to remain in place, the clean-up of the structures will be addressed in this guide.

This Safety Guide will apply to all types of facilities that are subject to decommissioning, including nuclear power plants and research reactors, nuclear fuel cycle facilities, accelerators, medical facilities, research and university laboratories, and other research and industrial facilities that use radioactive materials or radiation sources and that require a graded approach to regulation. It will also be applicable to industries processing naturally occurring radioactive material (NORM), as far as they are related to planned exposure situations. It will apply neither to tailings from processing of ores nor to radioactive waste disposal sites. However, it will apply to auxiliary facilities at such sites, such as milling facilities associated to uranium mines.

This publication will focus on radiation protection aspects, on required legal and regulatory framework, on planning and implementation of clean-up activities, on demonstration of compliance with the release criteria, and on introduction of a new facility or activity on the released site. It will address both release without restrictions and release with restrictions, followed by implementation of institutional controls. It will also address the release of a part of the site, when the rest of the site remains under regulatory control. The process of identification, implementation and removal of institutional controls when they are not needed anymore will be addressed, as well as associated responsibilities of different parties. Guidance on involvement of interested parties in relation to aspects of release of sites will also be provided.

Release of material and waste from regulatory control (clearance) is out of the scope of this Safety Guide. However, a paragraph will make reference to the Safety Guide DS500 “Application of the Concept of Clearance” for guidance on that topic.

In the context of this Safety Guide, “release of sites from regulatory control” refers only to the release of sites from the requirements for radiation protection of people and the environment, issued by the appropriate regulatory body, which does not preclude that other regulations may still apply at the sites. Sites considered for release from radiological regulatory control may pose significant non-radiological hazards to workers, the public and the environment that should be addressed during decommissioning activities. The protection of human health and the environment against such non-radiological hazards is outside the scope of this Safety Guide. However, in the context of decommissioning, these hazards are required to be given due consideration during the planning and implementation process, in the safety assessments and environmental assessments, in the estimation of costs and the provision of finance for the decommissioning project, and in the considerations related to decommissioning end state and release of site.

This Safety Guide will not be applicable to existing exposure situations, that is, it will not apply to remediation and release of sites and areas contaminated as a result of past activities that were not adequately controlled, where there is no licensee in place anymore, or as a result of severe accidents. Remediation actions might be needed at sites that have been contaminated as a result of unauthorized activities, such as inadequate activities for radioactive waste management, accidental radioactive discharges to the environment, nuclear accidents, nuclear weapon tests and past activities that were not adequately controlled. Such situations are out of the scope of this Safety Guide.

This Safety Guide will not address site restoration after clean-up operations (for example, use of backfill materials produced during demolition and clean-up actions).

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

In the long term structure of the IAEA safety standards, the proposed publication will be a Specific Safety Guide supporting the GSR Part 6.

The following Safety Standards Series publications have identified the importance of establishing criteria for release of sites and of their application:

1. INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Facilities, IAEA Safety Standards Series No. GSR Part 6, IAEA, Vienna (2014).
2. INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014).
3. INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities, IAEA Safety Standards Series No. SSG-47, IAEA, Vienna (2018).
4. INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Medical, Industrial and Research Facilities, IAEA Safety Standards Series No. SSG-49, IAEA, Vienna (2019).
5. INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Concept of Clearance, IAEA Safety Standards Series No. DS500, IAEA, Vienna (in publication).
6. INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Assessment for Facilities and Activities, IAEA Safety Standards Series No. GSR Part 4 (Rev. 1), IAEA, Vienna (2016)
7. INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership and Management for Safety, IAEA Safety Standards Series No. GSR Part 2, IAEA, Vienna (2016)
8. INTERNATIONAL ATOMIC ENERGY AGENCY, Communication and Consultation with Interested Parties by the Regulatory Body, IAEA Safety Standards Series No. GSG-6, IAEA, Vienna (2017)
9. INTERNATIONAL ATOMIC ENERGY AGENCY, Occupational Radiation Protection, IAEA Safety Standards Series No. GSG-7, IAEA, Vienna (2018)
10. INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection of the Public and the Environment, IAEA Safety Standards Series No. GSG-8, IAEA, Vienna (2018)
11. INTERNATIONAL ATOMIC ENERGY AGENCY, Regulatory Control of Radioactive Discharge to the Environment, IAEA Safety Standards Series No. GSG-9, IAEA, Vienna (2018)
12. INTERNATIONAL ATOMIC ENERGY AGENCY, Functions and Processes of the Regulatory Body for Safety, IAEA Safety Standards Series No. GSG-13, IAEA, Vienna (2018)

The following Safety Report Series publication is also relevant to the context of the revised Safety Guide, as the methodology presented there may also be useful for license termination processes with appropriate consideration of relevant criteria for site release:

1. INTERNATIONAL ATOMIC ENERGY AGENCY, Monitoring for Compliance with Remediation Criteria for Sites, IAEA Safety Report Series No. 72, IAEA, Vienna (2012).

Aspects covered in this publication will be elaborated with more technical details in a Safety Report publication planned to be published after the completion of the International Project COMDEC.

The proposed publication is not an “interface document”, as it doesn’t address any security related aspects. It is considered that at the very end of a decommissioning project or in other situations where a site is considered for a release from regulatory control, of the remaining quantities of radioactive material on the site are very low, so security arrangements could be simple and don’t need elaboration in this Safety Guide.

There is no need for consultations with other sections of the NS Department as part of the drafting process, as the topic is clearly within the remit of the WES section of NSRW.

7. OVERVIEW

The provisional Table of Content is provided below.

1. INTRODUCTION

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Identification of possible clean-up options and selection of clean-up option based on optimization of protection

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Graded approach

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Radiological monitoring during clean-up

Management of radioactive waste generated during clean-up

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Demonstrating compliance with release criteria

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ANNEX I: EXAMPLE OF THE CONTENTS OF A CLEAN-UP PLAN

ANNEX II: EXAMPLE OF RELEASE WITHOUT RESTRICTIONS

ANNEX III: EXAMPLE OF RELEASE WITH RESTRICTIONS AND IMPLEMENTATION OF INSTITUTIONAL CONTROLS

REFERENCES

8. PRODUCTION SCHEDULE

Provisional schedule for preparation of the publication, outlining realistic expected dates for each step:

STEP 1: Preparing a DPP	July 2022
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	May 2023 – June 2024
STEP 6: Approval of draft by the Coordination Committee	August 2024
STEP 7: Approval by the relevant review Committees for submission to Member States for comments	November 2024
STEP 8: Soliciting comments by Member States	January 2025 – April 2025
STEP 9: Addressing comments by Member States	May 2025

STEP 10: Approval of the revised draft by the Coordination Committee Review in NS-SSCS	July 2025
STEP 11: Approval by the relevant review Committees	November 2025
STEP 12: Endorsement by the CSS	April 2026
STEP 13: Establishment by the Publications Committee and/or Board of Governors (for SF and SR only))	N/A
STEP 14: Target publication date	December 2026

9. RESOURCES

Estimated resources involved by the Secretariat (person-weeks) and the Member States (number and type of meetings)

- 3 consultancy meetings (3 consultants x 5 days for each meeting)
- 6 one-week home based assignments
- 1 Technical Meeting (25 participants x 4 days)
- IAEA staff:
 - 1 Technical Officer – 12 weeks
 - 1 administrative assistant – 3 weeks

ANNEX – Feedback Analysis Report

The needs for revision of the WS-G-5.1 have been discussed as part of the IAEA's International Project on Completion of Decommissioning (COMDEC), in several Technical Meetings held from 2017 to 2022, and in several sessions of the WASSC committee.

Here presented is an overview of the main recommendations and conclusions from the feedback received.

The WS-G-5.1 was published in 2006, the same year when the Safety Fundamentals SF-1 were published, and prior to the publication of most of the current Safety Requirements in the waste safety and radiation safety areas. It covers aspects of relevance to protection of public and the environment against radiation and to management of radioactive waste.

Both the key related Safety Requirements documents, the Basic Safety Standards and the decommissioning requirements, have been revised in the meantime (GSR Part 3 and GSR Part 6 published in 2014), introducing new concepts and definitions such as exposure situations, thus making the WS-G-5.1 outdated. Two new decommissioning Safety Guides SSG-47 and SSG-49 have been published in 2018 and 2019. Consistency with them needs to be ensured.

The WS-G-5.1 references older documents that have been revised or are in the process of being revised. Examples include the BSS (SS-115), WS-R-5, WS-G-2.1, WS-G-2.2, WS-G-2.4, SS 111F, WS-R-1 and others. The references to these documents will have to be checked to ensure the information is still presented in the newer publication. Some of these references include specific paragraph numbers that have certainly changed.

The WS-G-5.1 applies to practices (to planned exposure situations) and not to existing exposure situations (or to intervention, as defined in the old BSS). This is consistent and does not need to change, except for removing references to interventions in the text of WS-G-5.1.

The WS-G-5.1 provides information on the development of a clean-up plan and uses the term “clean-up” throughout the document. The term ‘clean-up’ was not defined in the GSR Part 3, but has been defined later in the IAEA Safety Glossary (2018 Edition) for use in the context of completion of decommissioning, which facilitates the continuation of the use of this term in the revised guidance.

The dose limit of 1 mSv in a year for members of the public (para 2.4 of WS-G-5.1) is consistent with the GSR Part 3 (Schedule III.3 (a)) for public exposure.

Paragraph 2.10 and figure 1 of the WS-G-5.1 are generally still consistent with the GSR Part 3. In some aspects the WS-G-5.1 seems to be more restrictive than the GSR Part 3. For example, the dose constraint of 300 $\mu\text{Sv/a}$ for site release was selected on the basis of the ICRP 82 recommendation (the same criterion reconfirmed in ICRP 103) and not on the basis of the GSR Part 3. Consequently, the criterion will remain applicable as long as the related ICRP recommendations are not superseded.

More detailed guidance is needed for cases where release with restrictions is planned. Paragraphs 5.16 to 5.20 of the WS-G-5.1 provide guidance for a restricted release of a site; however, additional information may be required to implement this guidance. It might be more appropriate to include these details in a Safety Report instead of adding additional guidance to the WS-G-5.1. Typical questions to be addressed include:

- What dose criteria does the regulatory body use to develop the release criteria for a restricted release (in Bq/g)? What is the basis? [300 μSv ?] (para 5.16)

- What are examples of mechanisms that the regulatory body can use to demonstrate compliance with the established restrictions? What kind of monitoring and for how long should it be performed? (para 5.17)
- What are typical measures that can be used to control potential uses of the site in the future? (para. 5.17(b))
- If building foundations are left onsite (i.e., anything below 2 meters), how do one ensure that the areas below the foundations meet the restricted or unrestricted release criteria? If they are left, does that imply use of a restricted release?

In conclusion – the revision of the WS-G-5.1 is necessary as soon as the resources allow. It should address the issues listed in this feedback analysis report.