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1. IDENTIFICATION

Document Category or set of publications to be revised in a concomitant manner

Safety Guide

Working ID: DS526

Proposed Title: National Policies and Strategies for the Safety of Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation

Proposed Action: Development of a new Safety Guide

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

Technical Officer(s): D.G. Bennett

2. BACKGROUND

The achievement of safety during radioactive waste and spent fuel management, decommissioning and remediation is dependent on the availability and implementation of comprehensive national policies and strategies¹. Such national policies and strategies are also essential elements that assist Member States to achieve UN Sustainable Development Goals.

National policies and strategies for radioactive waste and spent fuel management, decommissioning and remediation need to consider and include all of the relevant sites, facilities and activities and their life cycles and their interdependencies within a broader national programme² in order to facilitate the achievement of a properly optimized level of safety. It is not sufficient only to optimize individual sites, facilities and activities, such as a single disposal facility or a single decommissioning project; optimization should also occur at the level of the national programme.

Radioactive waste, spent fuel, decommissioning and remediation may be treated either in one unified or in several specific national policies and strategies, provided those specific approaches are coordinated and consistent with each other.

The Code of Conduct on the Safety and Security of Radioactive Sources: Guidance on the Management of Disused Radioactive Sources, notes that each state should ensure that the national policy and strategy for the management of disused sealed radioactive sources is part of, or compatible with, the national policy and strategy for the management of radioactive waste.

¹ Policy establishes aims or ends. Strategy is about the achievement of policy aims by selection of suitable strategic approaches that can be achieved with the application of available resources. Strategy is based upon a series of assumptions that can change over time. National policies should reflect national priorities, circumstances, structures, human and financial resources and should be reviewed and possibly updated from time to time.

² In such a programme a group of related radioactive waste and spent fuel management, decommissioning and remediation projects is managed in a coordinated way and with a particular long-term aim, in order to obtain benefits and control not available from managing the projects individually.

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the Joint Convention) places specific obligations on Contracting Parties. Article 32 of the Joint Convention requires Contracting Parties to report on radioactive waste policy and spent fuel management policy and on the implementation of practices aimed at the achievement of these policies. In the summary report of the Sixth Review Meeting of the Joint Convention, the Contracting Parties highlighted, as an ‘overarching issue’, the importance of furthering the development and implementation of national policies and strategies for Radioactive Waste and Spent Fuel management, decommissioning and remediation. This is consistent with the following:

1. The legacy of historical sites, facilities and radioactive waste and spent fuel that exists. For example, some States have nuclear facilities that have been permanently shut down with no clear plans for decommissioning. Areas affected by past accidents and various past activities that have not been properly managed or regulated also exist in some States.
2. Information in the IAEA Radiation Safety Information Management System (RASIMS) database for Thematic Safety Area 4 (TSA4 – Public and Radiological Protection and Waste Safety), which shows that national policies and strategies for the safety of radioactive waste and spent fuel management, decommissioning and remediation remain weak or non-existent in many Member States.
3. Feedback from IAEA peer review services (e.g. IRRS, Artemis) which indicates that further, better integrated, guidance is needed to assist Member States to develop, refine and implement national policies and strategies. Such guidance is also needed for delivery of peer review services.
4. The observation by Richard A. Meserve, Chairman of the International Nuclear Safety Group (INSAG), in his 2019 Annual Letter of Assessment to the Director General of the IAEA, that it is long overdue for all countries using nuclear technologies to establish and pursue comprehensive radioactive waste management strategies, with disposal as their endpoint.

For these and other reasons, including particularly the need to protect people and the environment, present and future, against radiation risks (Principle 7 of the Fundamental Safety Principles), there is a need for a holistic approach to the development of national policies and strategies for radioactive waste and spent fuel management, decommissioning and remediation. This need includes consideration, where relevant, of the arrangements for the safe management of radioactive residues arising from the mining, milling and processing of ores (primarily uranium and thorium), and from other activities generating residues containing naturally occurring radioactive material, NORM.

Summary of Analysis of Existing Safety Standards Publications on this Topic

The Safety Requirements relevant to national policies and strategies for radioactive waste and spent fuel management, decommissioning and remediation are included in multiple IAEA Safety Standards. For example, Requirements 1 and 10 of GSR Part 1; Requirements 29, 31, 47 and 49 of GSR Part 3; Requirement 2 of GSR Part 5; Requirement 8 of GSR Part 6 and Requirement 15 of GSR Part 7. Guidance on national policies and strategies for radioactive waste and spent fuel management, decommissioning and remediation is also included in multiple Safety Guides (e.g. SSG-14, SSG-15, SSG-47), but overall this guidance is uneven, and it is not well integrated or comprehensive. For example, one gap relates to a lack of guidance on optimization at the level of a national programme. Some further examples of deficiencies follow.

Specific Safety Guide SSG-14, Geological Disposal Facilities for Radioactive Waste, states that: “*This Safety Guide provides guidance for policy makers...*”, however, it focusses on individual geological disposal facilities and provides no guidance on national policies or strategies or their development.

Elements of national policies and strategies that have a large bearing on decisions made with respect to geological disposal are not within the scope of SSG-14, which is focused on the safety case for individual facilities.

Specific Safety Guide SSG-15, Storage of Spent Nuclear Fuel, states that “... *In determining the overall strategy, the owner should take into account interdependencies between all stages of spent fuel management, the options available and the overall national spent fuel management strategy.*” SSG-15 does not provide guidance on how such interdependencies should be taken into account.

Specific Safety Guide SSG-47, Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities, provides in Section 5 considerable guidance on the selection of decommissioning strategies for individual sites and facilities, and notes at paragraph 5.19 that these may be influenced by national policies on the management of radioactive waste. However, SSG-47 does not give guidance on how national policies for the safety of radioactive waste management can be developed or on how they influence selection of an appropriate decommissioning strategy for a single facility.

3. JUSTIFICATION FOR THE PRODUCTION OF THE DOCUMENT

Given that appropriate national policies and strategies are needed to address existing and new facilities and activities, to address existing legacy situations and to prevent the creation of future legacy situations, there is a clear need for comprehensive, integrated guidance on approaches to their development and implementation.

Although there are many requirements on national policies and strategies on radioactive waste and spent fuel management, decommissioning and remediation in the IAEA Safety Requirements, the existent supporting guidance is not comprehensive or well-integrated and does not fulfil Member States requests for how to establish and implement national policies and strategies.

At its 44th Meeting in November 2017, the Waste Safety Standards Committee (WASSC) considered the totality of the existing safety standards and proposed the development of a new Safety Guide on National Policies and Strategies for the Safety of Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation.

A new Safety Guide on this topic will provide valuable, sought-after support to the IAEA Member States and the Contracting Parties to the Joint Convention on establishing and implementing national policies and strategies for the management of radioactive waste and spent fuel, including radioactive waste generated in a nuclear or radiological emergency, decommissioning and remediation – guidance that does not presently exist.

A new Safety Guide is proposed because it would be difficult and hardly manageable to revise the many existing safety standards publications that currently contain only brief references to policies and strategies on radioactive waste and spent fuel management, decommissioning and remediation, and because this would not solve the fragmentation of the guidance on establishing and implementing these policies and strategies. The development of this new Safety Guide is an opportunity to capture new learning, address the gaps and slight inconsistencies in the existing guidance, and provide more comprehensive and integrated guidance; subsequent revisions of related Safety Standards should then lead to improved consistency of the guidance provided by the Safety Standards as a whole.

4. OBJECTIVE

The objective of this Safety Guide is to provide integrated, comprehensive recommendations on developing, revising and implementing newly developed and revised national policies and strategies for the safe management of all types of radioactive waste and spent fuel and radioactive residues (such as residues containing naturally occurring radioactive material, NORM) and for the safe decommissioning

of facilities and activities, and for remediation of sites and other areas contaminated by radioactive substances. In so doing, the Safety Guide will address optimization and interdependencies at the national level in accordance with Principle 5 of the Fundamental Safety Principles and Requirement 6 of GSR Part 5.

The target audience for the publication will be governments, regulatory bodies, licensees, operating organizations and other parties with interests, for example, in the remediation of sites or contaminated areas and the recovery process for areas affected by past activities or events.

5. SCOPE

The Safety Guide will address:

1. National policies and strategies for safe management of radioactive waste and spent fuel and residues, including NORM residues, arising from activities and facility operations, emergencies, decommissioning and remediation.
2. All steps in the management of radioactive waste and spent fuel and residues, including characterization and classification, minimization of generation, clearance, predisposal management and disposal.
3. National policies and strategies for decommissioning of facilities.
4. National policies and strategies for remediation of sites and other areas contaminated by radioactive substances.

Although the Safety Guide will address national policies and strategies for the safe management of radioactive waste generated as a result of a nuclear or radiological emergency, it will not provide guidance on emergency preparedness and response for radioactive waste and spent fuel management, decommissioning and remediation. Reference to the current guidance on emergency preparedness and response will be provided.

Nuclear security can factor into national policies and strategies for radioactive waste and spent fuel management, decommissioning and remediation and will be given due consideration as the development of the guide progresses.

Although the Safety Guide will address radioactive waste generated as a result of reprocessing of spent fuel, consistent with the Joint Convention it will not address spent fuel held at reprocessing facilities as part of a reprocessing activity. The Safety Guide will address waste management activities (including decommissioning) relating to operations associated with the production of nuclear energy and research and development activities related to waste management, but it will not address other parts of the nuclear fuel cycle as defined in the IAEA Safety Glossary.

Although transport options and infrastructure can influence national strategies for radioactive waste and spent fuel management, decommissioning and remediation, this Safety Guide will not address the details of radioactive waste transport (e.g. transport regulations). Such details are at a level that would generally be too great to be significant in the development of national policies and strategies. Similarly, this Safety Guide will not address the details of technologies for the characterization of radioactive waste and spent fuel or of other technologies.

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

The Safety Guide will have a cross-cutting role in in the Safety Standards Series, similar to that of General Safety Guide GSG-1, 'Classification of Radioactive Waste'.

This Safety Guide will interface with the following IAEA Safety Standards and related international conventions (the list is not intended to be final or exhaustive):

- SF-1 Fundamental Safety Principles
- GSR Part 1 (Rev. 1) Governmental, Legal and Regulatory Framework for Safety
- GSR Part 2 Leadership and Management for Safety
- GSR Part 3 Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards
- GSR Part 4 (Rev. 1) Safety Assessment for Facilities and Activities
- GSR Part 5 Predisposal Management of Radioactive Waste
- GSR Part 6 Decommissioning of Facilities
- SSR-5 Disposal of Radioactive Waste
- GSG-1 Classification of Radioactive Waste
- RS-G-1.7 Application of the Concepts of Exclusion, Exemption and Clearance (under revision by DS499 Application of the Concept of Exemption and DS500 Application of the Concept of Clearance)
- SSG-1 Borehole Disposal Facilities for Radioactive Waste (under revision by DS512)
- SSG-14 Geological Disposal Facilities for Radioactive Waste
- SSG-29 Near Surface Disposal Facilities for Radioactive Waste
- SSG-23 The Safety Case and Safety Assessment for the Disposal of Radioactive Waste
- SSG-31 Monitoring and Surveillance of Radioactive Waste Disposal Facilities
- SSG-40 Predisposal Management of Radioactive Waste from Nuclear Power Plants and Research Reactors
- SSG-41 Predisposal Management of Radioactive Waste from Nuclear Fuel Cycle Facilities
- SSG-44 Establishing the Infrastructure for Radiation Safety
- SSG-45 Predisposal Management of Radioactive Waste from the Use of Radioactive Material in Medicine, Industry, Agriculture, Research and Education
- SSG-47 Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities
- SSG-49 Decommissioning of Medical, Industrial and Research Facilities
- WS-G-5.1 Release of Sites from Regulatory Control on Termination of Practices
- WS-G-6.1 Storage of Radioactive Waste

- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, INFCIRC/546
- Code of Conduct on the Safety and Security of Radioactive Sources: Guidance on the Management of Disused Radioactive Sources, GC(61)/23
- Council Directive 2011/70/Euratom Establishing a Community Framework for the Responsible and Safe Management of Spent Fuel and Radioactive Waste
- Nuclear Security Series No. 11, Security of Radioactive Sources
- Nuclear Security Series No. 14, Nuclear Security Recommendations on Radioactive Material and Associated Facilities

The Safety Guide will interface with the following draft Safety Standards being in an advanced stage of development:

- DS459 Management of Residues Containing Naturally Occurring Material from Uranium Production and Other Activities (Revision of Safety Guide WS-G-1.2)
- DS468 Remediation Strategy and Process for Areas Affected by Past Activities or Events (Revision of Safety Guide WS-G-3.1)
- DS477 Leadership, Management and Culture for Safety in Radioactive Waste Management, (Revision and combination of Safety Guides GSG-3.3 and GS-G-3.4)
- DS489 Storage of Spent Nuclear Fuel (Revision of Safety Guide SSG-15 by amendment)
- DS499 Application of the Concept of Exemption (Revision of Safety Guide RS-G-1.7)
- DS500 Application of the Concept of Clearance (Revision of Safety Guide RS-G-1.7)

As appropriate, information from the following IAEA Nuclear Energy Series publications will be taken into account in the development of this Safety Guide³:

- NW-G-1.1 Policies and Strategies for Radioactive Waste Management
- NW-G-2.1 Policies and Strategies for the Decommissioning of Nuclear and Radiological Facilities
- NW-G-3.1 Policy and Strategies for Remediation

7. OVERVIEW

Topics which will be considered in developing the Safety Guide include:

1. The justification for, and prioritization amongst, the development of new facilities and activities, the decommissioning of facilities and the remediation of existing sites and contaminated areas, across the nation. This will include managing legacy waste and waste generated as a result of nuclear or radiological emergencies, and taking account of ethical issues such as inter-generational and inter-regional equity, the transfer of risk resulting from import and export, the participation of interested parties, and the consideration of precautionary measures.

³ These NE Series publications are concerned with waste technologies and refer to obsolete and superseded Safety Standards (e.g. Safety Series No. 115 dated 1996; WS-R-1 dated 1999; GS-R-1 dated 2000; WS-R-2 dated 2000; WS-G-2.5 dated 2003; WS-G-2.7 dated 2005). As such they were not endorsed by Safety Standards Committees.

2. National needs for, and provision of, resources over time, and how to balance short-term and long-term commitments and liabilities.
3. The roles of radioactive waste classification, characterization and clearance in the national system for radioactive waste management, and their implications for the inventory of radioactive waste and for other components of the national system for the management of radioactive waste and spent fuel, decommissioning and remediation.
4. Defining and maintaining national inventories of residues and radioactive waste and spent fuel taking account of both existing and potential future waste streams.
5. Assessing, siting, and developing the range of predisposal management facilities (e.g. processing and storage facilities) and disposal facilities required nationally, including local, regional and centralized facilities.
6. The scope and content of national programmes for the implementation of national strategies and the achievement of national policy aims.⁴
7. Monitoring of the national programme for the implementation of strategies for the safety of radioactive waste and spent fuel management, decommissioning and remediation, including establishment of key performance indicators and dissemination of relevant information.
8. The timing/scheduling and duration of activities across the nation and their implications (e.g. of waste generation, of decommissioning and remediation, of local, regional and centralized storage, of disposal facility development and operation).
9. End-states and institutional control of sites and facilities, and remediation objectives and their consistency across the nation.
10. Optimization of the national programme for radioactive waste and spent fuel management, decommissioning and remediation taking account of interdependencies.
11. Periodic review of national policies and strategies for the safety of radioactive waste and spent fuel management, decommissioning and remediation.
12. The relationships of national policies and strategies for the safety of radioactive waste and spent fuel management, decommissioning and remediation with other policies and strategies (e.g. on environmental protection) and their potential roles in achieving UN Sustainable Development Goals.

A tentative structure and content for the Safety Guide is as follows; the detailed content of the Safety Guide will be confirmed during its development. The Safety Fundamentals and Requirements will be used as the primary basis for the guidance to be developed. The Safety Guide will include appropriate explanations of key terms, such as policy, strategy and programme, that are not included in the 2018 Safety Glossary.

⁴ Information from relevant sources will be considered, including Article 12 “Contents of national programmes” of Council Directive 2011/70/Euratom.

1. INTRODUCTION

- 1.1 Background
- 1.2 Objective
- 1.3 Scope
- 1.4 Structure

2. RESPONSIBILITIES

- 2.1 Responsibilities of the government
- 2.2 Responsibilities of the regulatory body
- 2.3 Responsibilities of licensees and operating organizations

3. NATIONAL POLICIES

This section will address topics such as the following and how they can be addressed in national policies for radioactive waste and spent fuel management, decommissioning and remediation.

3.1 Principles, objectives, approaches and other high-level considerations

- Safety objectives for protection of people and the environment
- Regulatory approaches
- Interactions with interested parties (including the public)
- Ethical issues, including inter-generational and inter-regional equity, the transfer of risk resulting from import and export, consideration of precautionary measures
- Safety culture
- The provision of resources, including financial provisions
- Integration of safety and security
- The graded approach and risk-informed approaches
- The relationships of national policies for the safety of radioactive waste and spent fuel management, decommissioning and remediation with other policies (e.g. on environmental protection)
- The relationships of national policies for the safety of radioactive waste and spent fuel management, decommissioning and remediation with UN Sustainable Development Goals

3.2 Development of national policies

- Phased approach to the development of national policies
- Interacting with interested parties in the development of national policies
- Existent legal and regulatory framework, and organizations
- Radioactive waste (including spent fuel declared as waste) and residues
 - Waste classification
 - Waste and residues characterization
 - Waste inventory development and maintenance
 - Residues inventory development and maintenance
 - Waste minimization (and the waste hierarchy)
 - Clearance
 - Transfers; domestic transfers, import and export
- Facilities and other infrastructure
 - Relevant infrastructure (e.g. existing facilities, sites and contaminated areas; transport options and routes)
 - Assessing, siting, and developing the range and types of waste management facilities required
 - Waste management routes for all waste streams
 - Development and optimal use of waste management facilities
- Decommissioning, remediation and sustainable end states
 - Decommissioning of facilities
 - Remediation of sites and of other areas contaminated by radioactive substances
 - Site end-states and institutional control of sites, facilities and other areas

3.3 Implementation of national policies

- Documentation of national policies
- Establishment of organizations
- Allocation of responsibilities
- Assessing, siting, and developing the range and types of waste management facilities required
- Provision of resources, including financial provisions
- Phased approach to the implementation of national policies

4. NATIONAL STRATEGIES

This section will address how the topics discussed in Section 3 can be addressed and implemented in national strategies and programmes for radioactive waste and spent fuel management, decommissioning and remediation.

4.1 Development of national strategies

- Development of national strategies for radioactive waste and spent fuel management, decommissioning and remediation
- The scope and content of national programmes for the implementation of national strategies and the achievement of national policy aims
- Identifying and taking account of interdependencies
- Interacting with interested parties in the development of national strategies and programmes

4.2 Implementation of national strategies

- Provision of resources, including financial provisions
- The prioritization and scheduling of activities taking account of the hazards, radiological risks and other types of risk
- Management, coordination and optimization of national programmes for radioactive waste and spent fuel management, decommissioning and remediation taking account of interdependencies
- Interacting with interested parties in the implementation of national strategies and programmes
- Monitoring the progress of national strategies and programmes for radioactive waste and spent fuel management, decommissioning and remediation, including establishment of key performance indicators and dissemination of relevant information
- Research and development in support of the national strategies and programmes for radioactive waste and spent fuel management, decommissioning and remediation

5. GRADED APPROACH TO NATIONAL POLICIES AND STRATEGIES

This section will address how the guidance provided in the preceding sections can be applied in different Member States having different programmes and situations, in accordance with the graded approach, taking account of hazards, radiological risks, and other types of risk.

5.1 Small programmes

- e.g. programmes with radioactive waste from the use of radioactive material in medicine, industry, agriculture, research and education but no research reactors or Nuclear Power Plants (NPPs)

5.2 Medium programmes

- e.g. programmes with one or more research reactors but no NPPs

5.3 Large programmes

- e.g. programmes with one or more NPPs

6. PERIODIC REVIEW OF NATIONAL POLICIES AND STRATEGIES

- Periodic review of national policies and strategies, including peer review and interacting with interested parties
- Coordination (e.g. amongst authorities and other organizations) in updating national policies and strategies

7. APPENDIX - List of interfaces with relevant safety standards

8. REFERENCES

9. ANNEX - Examples of national policies and strategies for radioactive waste and spent fuel management, decommissioning and remediation in Member States

10. CONTRIBUTORS TO DRAFTING AND REVIEW

8. PRODUCTION SCHEDULE: Provisional schedule for preparation of the document, outlining realistic expected dates for each step:

	DATE
STEP 1: Preparing a DPP	DONE
STEP 2: Approval of DPP by the Coordination Committee	DONE
STEP 3: Approval of DPP by the Review Committees	Q3 2020
STEP 4: Approval of DPP by the CSS	Q4 2020
STEP 5: Preparing the draft	Q4 2022
STEP 6: Approval of draft by the Coordination Committee	Q2 2023
STEP 7: Approval by the relevant review Committees for submission to Member States for comments	Q4 2023
STEP 8: Soliciting comments by Member States	Q2 2023
STEP 9: Addressing comments by Member States	Q4 2023
STEP 10: Approval of the revised draft by the Coordination Committee Review in NS-SSCS	Q1 2024
STEP 11: Approval by the relevant review Committees Review in NSOC-SGDS (Technical Editorial review)	Q4 2024
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	Q4 2024
STEP 13: Establishment by the Publications Committee and/or Board of Governors (for SF and SR only)	N/A
STEP 14: Target publication date	Q1 2025

9. RESOURCES

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

Staff: 25 staff weeks for drafting (assuming inputs from necessary staff in NSRW).

Consultants: 12-16 consultant weeks (assuming 4 one-week consultancies, each with 3-4 experts).

Technical Meeting: One technical meeting with participants from 30 Member States.