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Decommissioning of Facilities

General Safety Requirements Part 6 No. GSR Part 6

**Draft Safety Requirements
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CONTENTS

1. INTRODUCTION..... 1

 Background..... 1

 Objective..... 3

 Scope..... 3

 Structure..... 4

2. PROTECTION OF PEOPLE AND PROTECTION OF THE ENVIRONMENT 5

3. RESPONSIBILITIES ASSOCIATED WITH DECOMMISSIONING..... 6

4. MANAGEMENT OF DECOMMISSIONING 9

5. DECOMMISSIONING STRATEGY 10

6. FINANCING..... 11

7. THE PLANNING OF DECOMMISSIONING DURING THE LIFETIME OF THE FACILILTY 12

8. CONDUCT OF DECOMMISSIONING ACTIONS 14

9. COMPLETION OF DECOMMISSIONING ACTIONS AND TERMINATION OF
AUTHORIZATION 16

REFERENCES..... 18

CONTRIBUTORS TO DRAFTING AND REVIEW..... 19

1. INTRODUCTION

BACKGROUND

1.1. The terms ‘siting’, ‘design’, ‘construction’, ‘commissioning’, ‘operation’, and ‘decommissioning’ are normally used to delineate the six major stages of the lifetime of an authorized facility and of the associated licensing process. The term ‘decommissioning’ refers to the administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility (except for a disposal facility for radioactive waste, for which the term ‘closure’ instead of ‘decommissioning’ is used). Aspects of decommissioning have to be considered throughout the other five major stages.

1.2. Aspects of decommissioning typically include planning for decommissioning, conducting decommissioning actions and terminating the authorization. There may be a period of transition between permanent shutdown¹ and the time when authorization to begin decommissioning actions is granted.

1.3. ‘Facility’ means buildings and their associated land and equipment, in which radioactive material is produced, processed, used, handled or stored on a scale with such a degree of hazard and risks that consideration of protection and safety is required. ‘Land’ includes the surface, subsurface soil horizons and any surface or subsurface water or aquifers potentially affected by the radioactive material.

1.4. Decommissioning is performed using a graded approach to achieve a progressive and systematic reduction in radiological hazards. Decommissioning is undertaken on the basis of planning and assessment to ensure the safety, protection of workers and the public and protection of the environment.

1.5. ‘Decommissioning actions’ are the procedures, processes and work activities as described in the approved final decommissioning plan. Decommissioning actions are considered completed when the approved end state of the facility has been reached. Subject to national legal and regulatory requirements, this end state is a result of conducting decontamination and/or dismantlement, waste management and cleanup, leading to the release of the facility from regulatory control with or without restrictions on future use.

¹ The term ‘permanent shutdown’, as used in this publication, is when the facility has ceased operation and will not be restarted.

1.6. Planning for decommissioning begins at the design stage and includes the collection of information and data relevant to decommissioning to facilitate future decommissioning, selection of a decommissioning strategy, performance of radiological characterization of the facility, preparation of a final decommissioning plan, submission of the plan to the regulatory body for review and approval and any activities for public communication and consultation required by national requirements.

1.7. Conducting decommissioning actions includes managing the project, implementing the approved final decommissioning plan, managing radioactive waste and non-radioactive waste, and demonstrating that the facility meets the end state criteria specified in the final decommissioning plan. These activities are performed by the licensee. In parallel, oversight activities are conducted by the regulatory body.

1.8. Termination of the authorization involves the demonstration of compliance with the conditions of the authorization for decommissioning of the facility (i.e. meeting the end state criteria), withdrawal of this authorization for the facility, and release of the facility for restricted or unrestricted use.

1.9. Strategies for decommissioning that have been adopted or are being considered by Member States include immediate dismantling and deferred dismantling. In principle, these two possible decommissioning strategies are applicable for all facilities.

- *Immediate dismantling* - In this case, decommissioning actions begin shortly after the permanent shutdown. Equipment, structures, systems and components of a facility containing radioactive material are removed and/or decontaminated to a level that permits the facility to be released for unrestricted use, or released with restrictions on its future use.
- *Deferred dismantling* is the strategy in which, after removal of the nuclear fuel from the facility (for nuclear installations), all or part of a facility containing radioactive material is either processed or placed in such a condition that it can be put in safe storage and the facility maintained until it is subsequently decontaminated *and/or dismantled*. Deferred dismantling allows for the processing of some radioactive material and its removal from the facility.

1.10. A combination of these two strategies maybe considered practicable on the basis of safety requirements or environmental requirements, technical considerations and local conditions such as the intended future use of the site, or financial considerations. Entombment, in which all or part of the facility is encased in a structurally long lived material, is not considered a decommissioning strategy and is not an option in case of planned permanent shutdown. It may be considered a solution only under exceptional circumstances, (e.g. following a severe accident).

1.11. This IAEA publication establishes internationally agreed requirements for decommissioning of facilities, based on the fundamental safety objective and fundamental safety principles established in the Safety Fundamentals [1].

1.12. The terms used in this publication have the meanings ascribed to them in the IAEA Safety Glossary, 2007 Edition [2], where applicable.

1.13. This publication supersedes Decommissioning of Facilities Using Radioactive Material, IAEA Safety Series No. WS-R-5, issued in 2006².

OBJECTIVE

1.14. The objective of this publication is to establish the general safety requirements to be met during planning for decommissioning, conduct of decommissioning actions and termination of authorization.

SCOPE

1.15. This publication establishes the safety requirements for all aspects of decommissioning from the siting and design of a facility to the termination of the regulatory authorization.

1.16. This publication applies to nuclear power plants, research reactors, other nuclear fuel cycle facilities, including predisposal waste management facilities, facilities for processing naturally occurring radioactive material (NORM), and relevant medical facilities, industrial facilities and research facilities.

1.17. It does not apply to radioactive waste disposal facilities or disposal facilities for NORM or for waste from mining and mineral processing. Requirements for the closure of such facilities are established in Ref. [3]. However requirements for the decommissioning of supporting buildings and services of such facilities are established in the present publication.

1.18. The definition of decommissioning (para. 1.1) makes it clear that decommissioning is concerned with 'facilities', i.e. buildings, including their associated land and equipment. There may be areas of land that have become contaminated as a result of the normal operation of the facility. The cleanup of these areas would also be included as part of decommissioning.

²INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Facilities Using Radioactive Material, IAEA Safety Standards Series No. WS-R-5, IAEA, Vienna (2006).

1.19. This publication does not address the remediation of areas contaminated by residual radioactive material arising from past activities that (1) were never subject to regulatory control or (2) were subject to regulatory control but not in accordance with the requirements of the existing IAEA and national safety standards. It also does not address the remediation of areas affected by a nuclear or radiological emergency, after an emergency has been declared to be over. However, most of the requirements established in this safety standard can also be applied to decommissioning after an incident has occurred or a situation has arisen that has resulted in serious damage to, or the contamination of, a facility, or simply after a premature shutdown. The requirements for the remediation of such areas are established in Ref. [4].

1.20. The management of fresh nuclear fuel, spent nuclear fuel and radioactive waste generated during operations is not usually considered part of decommissioning. It is addressed as part of operations and is outside the scope of this publication.

1.21. This publication addresses the radiological hazards resulting from decommissioning. Non-radiological hazards, such as industrial hazards or hazards due to chemical waste, can be significant during decommissioning. Such hazards require due consideration in the planning and implementation process, in the safety assessments and environmental assessments, and in the estimation of costs and the provision of financial resources for the decommissioning project. However, these issues are outside of the scope of this publication and are not explicitly addressed here.

1.22. Security aspects have to be considered during decommissioning, but are out of the scope of this publication. The IAEA issues recommendations on nuclear security in the IAEA Nuclear Security Series [5].

STRUCTURE

1.23. Section 2 establishes the requirements for the protection and safety of workers and the public and for the protection of the environment. The responsibilities of the major parties associated with decommissioning are discussed in Section 3. Section 4 establishes the requirements for the management of decommissioning and Section 5 establishes the requirements for selecting a decommissioning strategy. Section 6 establishes the requirements for the financing of decommissioning and Section 7 discusses the planning for decommissioning that is done during the facility's lifetime. Section 8 establishes the requirements to be followed when conducting decommissioning actions. Section 9 establishes the requirements for determining when decommissioning has been completed, including surveys to demonstrate the completion of decommissioning actions and the termination of authorization.

2. PROTECTION OF PEOPLE AND PROTECTION OF THE ENVIRONMENT

Requirement 1: Optimization of protection and safety

Exposure during decommissioning shall be considered to be planned exposure situation and the relevant requirements of the Basic Safety Standards shall be applied accordingly during decommissioning.

2.1. The relevant dose limits for the exposure of workers and members of the public shall be applied during decommissioning [4]. Radiation protection of persons who are exposed as a result of decommissioning actions shall be optimized with due regard to the relevant dose constraints.

2.2. In addition to provisions to protect against exposure during planned activities, provision shall be made during decommissioning for protection against, and for mitigation of, exposure due to an incident. However, if the incident or the particular situation is of such a nature as to warrant remediation, the IAEA requirements from the Ref. [4] apply.

2.3. Compliance with national environmental protection regulations and requirements of the BSS [4] addressing protection of the environment shall be maintained during decommissioning and beyond if a facility is released with restrictions on future use.

Requirement 2: Graded approach

A graded approach shall be used for all aspects of decommissioning in determining the scope and level of detail for any particular facility, consistent with the magnitude of the possible radiation risks arising from the decommissioning.

2.4. The type of information and the level of detail in the decommissioning plans and supporting planning documents, including safety assessment, shall be commensurate with the type, scale, complexity, status and stage in the lifetime of the facility and with the hazards associated with the decommissioning of the facility [4, 6].

2.5. Conducting decommissioning by the licensee and the regulatory oversight shall be commensurate with the magnitude of hazards and risks (e. g. Safety Assessment, Emergency Response Arrangements).

Requirement 3: Assessment of safety

Safety shall be assessed for all facilities planning to and undergoing decommissioning.

2.6. The final decommissioning plan shall be supported by a safety assessment addressing the planned decommissioning actions and incidents that may occur or situations that may arise during decommissioning.

2.7. A safety assessment shall be prepared in accordance with Ref. [6].

3. RESPONSIBILITIES ASSOCIATED WITH DECOMMISSIONING

3.1. Requirements for general responsibilities within the governmental, legal and regulatory framework with respect to all matters concerning facilities and activities are established in Ref. [7]. These requirements apply in establishing the appropriate national organization and responsibility for decommissioning.

Requirement 4: Responsibilities of the government

The government shall establish and maintain a governmental, legal and regulatory framework within which all aspects of decommissioning, including management of the resulting radioactive waste, can be planned and carried out safely. This framework shall include a clear allocation of responsibilities, provision of independent regulatory functions and requirements for financial mechanisms for decommissioning.

3.2 The responsibilities of the government shall include:

- establishing a national policy for decommissioning and for the management of the resulting radioactive waste;
- establishing and maintaining the legal, technical and financial responsibilities for organizations involved in decommissioning, including decommissioning authorization and for the management of the resulting radioactive waste;
- ensuring that the necessary scientific and technical expertise remains available for both the licensee and for the support of regulatory review and other independent national review functions;
- establishing a mechanism to ensure adequate financial resources are available when needed for safe decommissioning and for the management of the resulting radioactive waste.

Requirement 5: Responsibilities of the regulatory body

The regulatory body shall regulate all aspects of decommissioning, from the siting and design of the facility to the completion of decommissioning actions and the termination of authorization. The regulatory body shall establish the safety requirements for decommissioning and adopt regulations and guides, including management of the resulting radioactive waste, and shall take actions to ensure that the regulatory requirements are met.

3.3. The responsibilities of the regulatory body shall include:

- establishing criteria and the timeframe for authorization for decommissioning;
- establishing criteria for safety, radiation protection and environmental protection for the decommissioning of facilities, including criteria for clearance of material during decommissioning in accordance with national policy and criteria for end states for decommissioning and termination of authorization;
- establishing requirements for financial assurance for decommissioning and for a mechanism to ensure that adequate resources will be available when necessary for safe decommissioning, in the case where the government has delegated this to the regulatory body;
- establishing requirements for planning of decommissioning, including;
 - identifying the typical content of the decommissioning plans and supporting documents for review or approval
 - establishing the review process for decommissioning plans and supporting documents (which are prescribed in national requirements);
 - reviewing the initial decommissioning plan and updates, review and approval of the final decommissioning plan and supporting documents, and review and approval of updates after the final decommissioning plan has been approved;
- giving interested parties an opportunity to provide comments on the final decommissioning plan and supporting documents before approval based on national requirements.
- inspecting and reviewing decommissioning actions and taking enforcement actions in case of non-compliance with the national legal and regulatory framework and the

authorization or licence conditions and safety requirements established by the regulatory body;

- promoting a safety culture in order to encourage a questioning and learning attitude towards safety and to discourage complacency [4, 8];
- establishing requirements for the collection and retention of records and reports relevant to decommissioning;
- evaluating the end state of a decommissioned facility and deciding whether the conditions have been met to allow the termination of authorization;
- establishing requirements and criteria for termination of authorization and especially when facilities are released with restrictions on future use;
- terminating the authorization when the licensee has demonstrated that the approved end state has been met;

Requirement 6: Responsibilities of the licensee

The licensee shall implement planning for decommissioning and shall carry out the decommissioning actions in compliance with the authorization and with requirements derived from the national legal and regulatory framework. The licensee shall be responsible for all aspects of safety, radiation and environmental protection during decommissioning.

3.4. The responsibilities of the licensee shall include:

- selecting a decommissioning strategy as the basis for preparing and maintaining decommissioning plans (initial and final) throughout the lifetime of the facility;
- preparing and submitting an initial decommissioning plan and its updates for review by the regulatory body
- establishing and implementing an integrated management system [8]; if the licensee changes during the lifetime of the facility, procedures shall be in place to ensure transfer of responsibilities for decommissioning to the new licensee.
- fostering a safety culture in order to encourage a questioning and learning attitude towards safety and to discourage complacency [4, 8];

- estimating the cost of decommissioning actions and providing financial assurances and resources to cover the costs associated with safe decommissioning, including management of resulting radioactive waste;
- notifying the regulatory body prior to permanent shutdown of the facility;
- submitting a final decommissioning plan and supporting documents for review and approval by the regulatory body, in accordance with national regulations, in order to obtain authorization for decommissioning;
- managing the decommissioning project and performing decommissioning actions;
- managing of remaining operational waste and all waste from decommissioning;
- ensuring that the facility is maintained in a safe configuration during transition and until the approval of the final decommissioning plan;
- performing safety assessments and environmental impact assessments in relation to decommissioning actions;
- preparing and implementing appropriate safety procedures, including emergency plans;
- ensuring that properly trained, qualified and competent staff are available for the decommissioning project;
- performing radiological surveys in support of decommissioning;
- ensuring that end state criteria have been met by performing a final survey;
- keeping and retaining records and submitting reports as required by the regulatory body.

4. MANAGEMENT OF DECOMMISSIONING

Requirement 7: Integrated management system

An integrated management system shall be applied to all aspects of decommissioning.

4.1. An integrated management system shall provide a single framework for the arrangements and processes necessary to address all the goals of the operating organization [8]. These goals shall include safety, health, environmental, quality and economic elements.

4.2. An integrated system for the management and implementation of decommissioning shall be established as part of the licensee's organization with the prime goal of ensuring that decommissioning will be conducted safely. The reporting hierarchy and lines of authority of the management for decommissioning shall not create conflicts between organizations and activities that could compromise safety during decommissioning.

4.3. The prime responsibility for safety shall remain with the licensee. The licensee can delegate the performance of defined tasks to contractors and the management for decommissioning shall ensure that the work of contractors is appropriately controlled and is conducted safely.

4.4. Individuals made responsible for performing decommissioning actions shall have the necessary skills, expertise and training to perform decommissioning safely. Provisions shall be made to ensure that the institutional knowledge about the facility is obtained and accessible and, as far as possible, the key staff is retained.

4.5. All individuals performing decommissioning actions shall have the responsibility to inform the decommissioning management of any concerns about safety. The decommissioning management also shall ensure that processes are in place to grant authority and support such individuals in suspending unsafe decommissioning actions.

4.6. Decommissioning shall be controlled through the use of written procedures. These procedures shall be subject to review and approval by the licensee's organizations responsible for ensuring safety and practicability. A methodology for issuing, modifying and terminating work procedures shall be established.

5. DECOMMISSIONING STRATEGY

Requirement 8: Selecting a decommissioning strategy

The licensee shall select a decommissioning strategy, which will form the basis for the planning for decommissioning. The strategy shall be consistent with national policy on decommissioning and radioactive waste management.

5.1. The preferred decommissioning strategy shall be immediate dismantling. However, there may be situations in which immediate dismantling is not a practicable strategy when all relevant factors are considered.

5.2. The selection of a decommissioning strategy shall be justified by the licensee.

5.3. The licensee shall demonstrate that, for the strategy selected, the facility will be maintained in a safe configuration at all times and will be decommissioned, and that no undue burdens will be imposed on future generations.

5.4. If the shutdown of a facility is sudden, the decommissioning strategy shall be reviewed on the basis of the situation that initiated the sudden shutdown to determine whether revision of the strategy is required. If shutdown is caused by an accident, the facility shall be brought to a safe configuration before an approved final decommissioning plan is implemented.

5.5. For sites with more than one facility, a site strategy for decommissioning shall be developed to ensure that the interdependences of the facilities are taken into account in the planning for individual facilities which will lead to final decommissioning plans for each facility (e.g. by means of partial site release).

6. FINANCING

Requirement 9: Financing of decommissioning

Responsibilities in respect of financial provisions for decommissioning shall be set out in national legislation. These provisions shall include establishing a mechanism to provide and ensure adequate financial resources are available when needed to ensure safe decommissioning.

6.1. Adequate financial resources to cover the costs associated with safe decommissioning, including management of the resulting waste, shall be available when needed.

6.2. The cost estimate shall be updated on the basis of the periodic update of the initial or final decommissioning plan. The financial assurance instrument shall be maintained consistent with the facility's specific cost estimate and shall be changed if appropriate.

6.3. If financial assurance for the decommissioning of an existing facility has not yet been obtained, adequate financial resources shall be put in place as soon as possible. Approval of a renewal or extension of the authorization shall include provisions for financial assurance.

6.4. If the decommissioned facility is released with restrictions on its future use, financial assurance shall ensure financial resources are available for monitoring, surveillance and control of the facility throughout the necessary time period.

7. THE PLANNING OF DECOMMISSIONING DURING THE LIFETIME OF THE FACILITY

Requirement 10: Planning of decommissioning

The licensee shall prepare a decommissioning plan and maintain it throughout the lifetime of the facility, according to the requirements of the regulatory body, in order to show that decommissioning can be accomplished safely to meet the defined end state.

7.1. The regulatory body shall ensure that licensees take decommissioning into account in the siting, design, construction, commissioning and operation of the facility, including by means of features to facilitate decommissioning, maintenance of records of the facility, and consideration of physical and procedural methods to limit contamination and/or activation.

7.2. At the siting stage, a background survey of the site, including obtaining information on radiological conditions, shall be performed prior to the construction of a new facility and the baseline data shall be updated prior to its commissioning. This information shall be used to determine background radiological conditions. For those activities for which no such background survey has been made in the past, data from analogous and undisturbed areas with similar characteristics shall be used instead of pre-operational baseline data.

7.3. For new facilities planning of decommissioning shall begin early in the design stage and shall continue through to termination of the authorization.

7.4. With the application for authorization to operate the facility, the licensee shall prepare and submit an initial decommissioning plan. This initial decommissioning plan shall be required in order to demonstrate the feasibility of decommissioning, to ensure that sufficient financial resources will be available for decommissioning, to identify categories and estimate quantities of waste that will be generated during decommissioning.

7.5. The initial decommissioning plan shall be updated by the licensee and shall be reviewed by the regulatory body periodically, at least every five years unless otherwise prescribed by the regulatory body; or when specific circumstances warrant, such as if changes in an operational process lead to significant changes to the plan. The initial plan shall be updated as necessary in the light of operational experience gained, lessons learned from the decommissioning of similar facilities, new or revised safety requirements, or technological developments relevant to the selected decommissioning strategy. If an incident occurs or a situation arises with consequences relevant for decommissioning, the initial decommissioning plan shall be updated by the licensee as soon as possible and shall be reviewed by the regulatory body.

7.6. For existing facilities where there is no initial decommissioning plan, a suitable plan for decommissioning shall be prepared by the licensee as soon as possible and the plan shall be periodically reviewed and updated.

7.7. Appropriate records and reports that are relevant to decommissioning (e.g. records and reports of events) shall be retained by the licensee during the lifetime of the facility. The design and modifications to the facility and its operating history shall be identified and shall be considered in preparing the decommissioning plans. If permanent shutdown occurs before a final decommissioning plan is prepared, such plan shall be prepared as soon as possible and adequate arrangements shall be made to ensure the safety of the facility until a final decommissioning plan can be implemented.

7.8. Between the permanent shutdown of operations at the facility and approval of the final decommissioning plan, there may be a period of transition. During the transition to decommissioning, operational authorization shall remain in place unless the regulatory body has approved modifications of the authorization on the basis of a reduction in the hazards associated with the facility. During this period, some preparatory actions for decommissioning can be performed based on the operational or modified authorization.

Requirement 11: Final decommissioning plan

Prior to conducting decommissioning actions, a final decommissioning plan shall be prepared and shall be submitted to the regulatory body for approval.

7.10 The licensee shall inform the regulatory body prior to permanent shutdown of the facility. If a facility is permanently shutdown and/or is no longer used for its intended purpose, a final decommissioning plan shall be submitted to the regulatory body for approval within two years after permanent shutdown, unless an alternative schedule is agreed by the regulatory body.

7.11 The final decommissioning plan and supporting documents shall include the decommissioning strategy; the schedule and sequence of decommissioning actions; the proposed end state and how the licensee will demonstrate that the end state has been achieved; the storage or disposal of the decommissioning waste, the timeframe for decommissioning; and details of the financing for the completion of decommissioning.

7.12 Large and complex decommissioning projects may benefit from having decommissioning actions divided into several phases. All phases to reach the end state shall be described in the final decommissioning plan and supporting documents. Updates of the final decommissioning plan shall include additional information for subsequent phases.

7.13 If the final decommissioning plan or updates include new technologies and concepts for decommissioning actions, the licensee shall demonstrate prior to their use that the use of such methods is safe and can effectively achieve the desired result.

7.14 During the preparation and update of the final decommissioning plan, the extent and type of radioactive material (e.g. activated and contaminated structures and components) at the facility shall be determined by means of a detailed characterization survey and on the basis of records collected during the operational period. If contamination or radioactive waste from operations remains at the facility (including in subsurface soils and groundwater), this radioactive material shall be included in the characterization survey. Additional characterization of the site for the purpose of evaluating and preventing potential migration shall be considered.

7.16 If the deferred dismantling strategy has been selected, the licensee shall demonstrate in the final decommissioning plan and/or supporting documents that such an option will be implemented safely. The availability of adequate financial resources to ensure the facility is maintained in a safe condition during the deferral period and for subsequent decontamination and/or dismantlement shall be demonstrated.

7.17 Updates of the final decommissioning plan shall be made as necessary in the light of experience gained in decommissioning, new or revised safety requirements, or new or revised national regulations. Updates of the final decommissioning plan by the licensee shall be subject to review and if warranted, approval by the regulatory body.

7.18 Interested parties shall be provided with an opportunity to examine the final decommissioning plan and, as appropriate, supporting documents, and to provide comments prior to its approval subject to national requirements.

8. CONDUCT OF DECOMMISSIONING ACTIONS

Requirement 12: Conduct of decommissioning actions

The licensee shall implement the final decommissioning plan including management of radioactive waste in compliance with national safety standards and requirements.

8.1. The licensee shall implement the final decommissioning plan once the regulatory body has approved it.

8.2. In the case of deferred dismantling, the licensee shall ensure that the facility is maintained, in a safe configuration and that subsequent decontamination and/or dismantlement will be performed in the future. An adequate programme for maintenance, monitoring and surveillance, which shall be

subject to the approval of the regulatory body, shall be developed to ensure safety during the period of deferment.

8.3. Consistent with the final decommissioning plan, decommissioning techniques shall be selected such that the protection of workers, public and the environment is optimized and the generation of waste is minimized. As decommissioning actions progress, such as decontamination, cutting and handling of large components, new hazards may be created. The impact of these actions on safety shall be assessed and managed so that the potential consequences of these new hazards are prevented, detected, and mitigated, to ensure that protection and safety are optimized.

8.4. The regulatory body shall make arrangements for and shall implement the inspection and review of the decommissioning actions to ensure that they are being carried out in accordance with the final decommissioning plan and the authorization and with other requirements for which the regulatory body has responsibility for oversight. If safety requirements and conditions for authorization are not met, the regulatory body shall take appropriate enforcement actions.

Requirement 13: Emergency response arrangements

Emergency response arrangements, commensurate with the hazards, shall be established and maintained and events significant to safety shall be reported to the regulatory body in a timely manner.

8.5. Requirements for preparedness and response for a nuclear or radiological emergency are established in Ref. [9].

Requirement 14: Radioactive waste management

Management of radioactive waste shall be established for all waste streams.

8.6. Disposal shall be the preferred management option for radioactive waste arising from operational activities that remains at the facility and radioactive waste that is generated during decommissioning [3]. If disposal capacity is not available, radioactive waste shall be stored safely in accordance with the relevant requirements [10].

8.7. Prior to starting decommissioning, the licensee shall ensure the availability of adequate processing and storage capabilities and transport package(s) for the radioactive waste resulting from the decommissioning.

8.8. If operational radioactive waste or nuclear fuel is present in the facility after its permanent shutdown, such material shall be removed prior to conduct of decommissioning actions and shall be transported to another authorized facility (e.g. for interim storage) in compliance with the applicable

transport regulations [11]. In case such removal is not possible during transition, the approved final decommissioning plan shall address the management of these materials as part of decommissioning. In both cases the management of such material shall be carried out in accordance with requirements [10].

9. COMPLETION OF DECOMMISSIONING ACTIONS AND TERMINATION OF AUTHORIZATION

Requirement 15: Completion of decommissioning actions and termination of authorization

On the completion of decommissioning actions, the licensee shall demonstrate that the end state criteria as defined in the final decommissioning plan and any additional regulatory requirements have been met. The regulatory body shall verify the compliance with end state criteria and shall decide on termination of the authorization.

9.1. A final decommissioning report shall be prepared by the licensee to demonstrate that the end state of the facility as specified in the approved final decommissioning plan has been met. This report shall be submitted to the regulatory body for review and approval.

9.2. The regulatory body shall review the final decommissioning report and shall evaluate the end state to ensure that the all regulatory requirements and end state criteria, as specified in the final decommissioning plan and in the decommissioning authorization, have been met. Based on this review and evaluation the regulatory body shall decide on the termination of the facility's authorization and on its release from regulatory control.

9.3. If the approved end state is termination of decommissioning authorization with restrictions on future use of the remaining structures and/or, appropriate controls and programmes for monitoring and surveillance shall be maintained to ensure optimization of protection and safety. These controls shall be specified and shall be subject to approval by the regulatory body. Clear responsibility shall be assigned for implementing and maintaining these controls and programmes. The regulatory body shall ensure that a mechanism is in place to ensure compliance with the restrictions on the release of the facility.

9.4. A system shall be established to ensure that all records are maintained in accordance with the records retention requirements of the integrated management system and the regulatory requirements.

9.5. If radioactive waste is stored on the site after decommissioning has been completed, a revised or new, separate authorization, including requirements for decommissioning of the storage facility, shall be issued.

9.6. In the case of the partial release of the site, a revised or new, separate authorization shall be issued, as appropriate.

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