

Superseded by NRRC-R-10 Rev. 0.1 2024

NRRC Technical Regulations

Decommissioning of Nuclear Facilities

**NRRC-R-10
2022**



هيئة الرقابة النووية والإشعاعية
Nuclear and Radiological Regulatory Commission

Superseded by NRRC-R-10 Rev. 0.1 2024

NRRC-R-10

Regulation

Decommissioning of Nuclear Facilities

2022

NRRC-R-10

Preamble

In accordance with the provisions of the Law of Nuclear and Radiological Control issued by Royal Decree No. (M/82) dated 25/7/1439 AH, and NRRC's Statute issued by the Ministers' Cabinet Resolution No. (334) dated 25 /6/1439 AH, the NRRC prepared regulations that ensure control over radiological activities and practices as well as nuclear and radiological facilities.

This regulation has been prepared on the basis of International Atomic Energy Agency (IAEA) standards, international best practices and the experiences of similar international regulatory bodies, and in accordance with the Kingdom's international commitments. This Regulation has been presented in "the Public Consultation Platform" for the public review, comments, feedback.

This regulation has been approved by the NRRC's Board of Directors in resolution No. (R/1/1/2022), dated 20/04/2022.



Table of Contents

Chapter 1: Objective, Scope, and Definitions	6
Section 1: Objective	6
Section 2: Scope	6
Section 3: Definitions	7
Chapter 2: Principles and Basic Requirements for Decommissioning	8
Section 4: Optimization of Protection and Safety in Decommissioning	8
Section 5: Graded Approach	8
Section 6: Assessment of Safety	9
Chapter 3: Responsibilities	9
Section 7: Responsibilities of the Licensee	9
Chapter 4: Decommissioning Strategy and Planning	10
Section 8: Decommissioning Strategy	10
Chapter 5: Decommissioning Planning During Facility Lifecycle	10
Section 9: Decommission Plan	10
Section 10: Final Decommission Plan	12
Chapter 6: Financing of Decommissioning	12
Section 11: Financing of Decommissioning	12
Chapter 7: Management of Decommissioning	13
Section 12: Management System	13

Chapter 8: Conduct of Decommissioning Actions	13
Section 13: Implementation of Decommissioning Plan	13
Section 14: Emergency Response Arrangements for Decommissioning	13
Section 15: Management of Radioactive Waste	13
Chapter 9: Completion of Decommissioning	14
Section 16: Completion of Decommissioning and Release from Regulatory Control	14

Table of reference

Nuclear security (NRRC-R-11)	7
Radiation Safety (NRRC-R-01)	8
Safety Assessment of Nuclear Facilities (NRRC-R-07)	9
Leadership and Management for Safety (NRRC-R-04)	13
Nuclear Facilities Emergency Preparedness and Response (NRRC-R-14)	13
Management of Radioactive Waste (NRRC-R-16)	14

Chapter 1: Objective, Scope, and Definitions

Section 1: Objective

1. The objective of this regulation is to define the safety requirements and process for the decommissioning of a nuclear facility from the siting phase until the end state of decommissioning.

Section 2: Scope

2. The regulation applies to the decommissioning of all nuclear facilities, except facilities for the disposal of radioactive waste.
3. The regulation defines the requirements related to decommissioning during the whole lifecycle of a nuclear facility, from its siting until the end state of decommissioning.
4. The regulation applies to decommissioning after an accident has occurred, after a situation has arisen that has resulted in serious damage to or the contamination of a nuclear facility, or after the premature shutdown of a facility.
5. This regulation addresses the radiological hazards resulting from decommissioning. Non-radiological hazards, such as industrial hazards or hazards due to chemical waste, are not addressed in this regulation.
6. This regulation does not address the remediation of areas contaminated by residual radioactive material arising from past activities that were never subject to regulatory control.

7. The requirements for the security arrangements during decommissioning are prescribed by Regulation on Nuclear security (NRRC-R-11).

Section 3: Definitions

Decommissioning plan

A document containing detailed information on the proposed decommissioning of a facility.

Decontamination

The complete or partial removal of contamination by a deliberate physical, chemical, or biological process.

Dismantling

The taking apart, disassembling and tearing down of the structures, systems and components of a facility for the purposes of decommissioning.

End state

A predetermined criterion defining the point at which a specific task or process is to be considered completed. It is used in relation to decommissioning activities as the final state of decommissioning.

Facility

Means buildings, and their associated land and equipment, in which radioactive material was or still is produced, processed, used, handled, or stored on a scale with such a degree of hazard and risk that the 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.



Immediate dismantling

Dismantling that begins shortly after permanent shutdown. The equipment and the structures, systems, and components of a facility containing radioactive material are removed and/or are decontaminated to a level that permits the removal of regulatory control from the facility and its release, either for unrestricted use or with restrictions on its future use.

Restricted use

The use of an area or of materials subject to restrictions imposed for reasons of radiation protection and safety.

Unrestricted use

The use of an area or of material without any radiologically based restrictions.

Chapter 2: Principles and Basic Requirements for Decommissioning

**Section 4: Optimization of Protection and Safety in
Decommissioning**

8. Exposure during decommissioning shall be considered to be a planned exposure situation, and the relevant requirements of the Regulation on Radiation Safety (NRRC-R-01) shall be applied accordingly during decommissioning.

Section 5: Graded Approach

9. A graded approach shall be applied in all aspects of decommissioning in determining the scope and level of detail for any particular facility,

commensurate with the type, scale, complexity, status and stage in the lifetime of the facility and with the radiation and other hazards associated with the decommissioning of the facility.

10. The management system of a nuclear facility shall be adjusted to the risks inherent to the decommissioning of the facility using graded approach.

Section 6: Assessment of Safety

11. The licensee shall assess safety for all nuclear facilities for which decommissioning is planned and for all nuclear facilities undergoing decommissioning. The safety assessment shall be performed according to the Regulation on Safety Assessment of Nuclear Facilities (NRRC-R-07) as appropriate for the decommissioning phase.

Chapter 3: Responsibilities

Section 7: Responsibilities of the Licensee

12. The licensee shall plan for decommissioning and shall conduct the decommissioning actions in compliance with the NRRC requirements. The licensee shall be responsible for all aspects of safety, radiation protection and protection of the environment during the conduct of decommissioning.
13. The prime responsibility for the safety of decommissioning shall remain with the licensee. The licensee can delegate the performance of specified decommissioning tasks to contractors, and the integrated management system shall make provisions to ensure that the work of contractors is appropriately specified and controlled and is conducted safely.



Chapter 4: Decommissioning Strategy and Planning

Section 8: Decommissioning Strategy

14. The licensee shall select a decommissioning strategy that will form the basis for the planning for decommissioning. The strategy shall be consistent with NRRC requirements.
15. The preferred decommissioning strategy shall be immediate dismantling. If another decommissioning strategy is chosen, it shall be justified by the licensee.

Chapter 5: Decommissioning Planning During Facility Lifecycle

Section 9: Decommission Plan

16. The licensee shall prepare a decommissioning plan for the construction license application and update this plan for the operating license application. The licensee shall periodically update the plan at intervals set by the NRRC, to maintain it throughout the lifetime of the facility, in order to show that decommissioning can be accomplished safely to meet the defined end state. The decommissioning plan and its updates shall be approved by the NRRC.
17. The decommissioning plan shall be detailed enough and correspond to the design and state of the facility. The decommissioning plan shall include at least:
 - a. The decommissioning strategy and its justification
 - b. Planned phases of the decommissioning project and its schedule

- c. A general description of the decommissioning methods and waste management solutions
 - d. A cost estimate for the decommissioning project, including waste management costs
 - e. The proposed end state of the site
18. For sites with more than one nuclear facility, the interdependences between the nuclear facilities shall be taking into account in the decommissioning plan for each individual nuclear facility. The licensee shall demonstrate that it is safe to dismantle the nuclear facility so that it will not have any influences on the safety of the other nuclear facilities still in operation.
19. Proposed decommissioning methods and techniques shall be selected such that protection and safety is optimized, the protection of the environment is ensured, the generation of waste is minimized and any potential negative impact on the storage and disposal of waste is minimized.
20. The impact of the selected methods and techniques on safety shall be assessed and managed so that the potential consequences of hazards are prevented or are detected and mitigated.
21. Updated decommissioning plans shall take into account at least technological development, changes made to the facility during its use, contamination of the facility, activation of materials, accumulation of radioactive waste, and incidents, if any have happened.



Section 10: Final Decommission Plan

22. Prior to the conduct of decommissioning actions, the licensee shall prepare a final decommissioning plan and it shall be submitted to the NRRC for approval.

Chapter 6: Financing of Decommissioning

Section 11: Financing of Decommissioning

23. The licensee shall present the cost estimate for the decommissioning in the decommissioning plan.
24. The cost estimate shall cover the costs associated with safe decommissioning, including management of the resulting radioactive waste and spent fuel. The licensee shall ensure that adequate financial resources are available to cover all costs.
25. The licensee shall update the cost estimate for the decommissioning on the basis of the periodic update of the decommissioning plan or on the basis of the final decommissioning plan.
26. If the decommissioned nuclear facility or a site is to be released with restrictions on its future use, the cost estimate for decommissioning shall also include the monitoring, surveillance and control of the nuclear facility or a site throughout the necessary time period.
27. In the event of a sudden shutdown of the facility, provisions shall be put in place to enable the use of the financial resources for decommissioning when they are needed.

Chapter 7: Management of Decommissioning

Section 12: Management System

28. The licensee shall ensure that its integrated management system, as prescribed by the Regulation on Leadership and Management for Safety (NRRC-R-04), is updated to cover all aspects of decommissioning before applying for a decommissioning license. The management system for decommissioning shall reflect the nature of, and risks associated with the decommissioning project.

Chapter 8: Conduct of Decommissioning Actions

Section 13: Implementation of Decommissioning Plan

29. The licensee shall implement the final decommissioning plan, including the management of radioactive waste, in compliance with license conditions and regulatory authorization.

Section 14: Emergency Response Arrangements for Decommissioning

30. Emergency response arrangements, as prescribed by Regulation on Nuclear Facilities Emergency Preparedness and Response (NRRC-R-14), shall be updated and maintained for decommissioning, commensurate with the hazards, and events significant to safety shall be reported to the NRRC in a timely manner.

Section 15: Management of Radioactive Waste

31. Radioactive waste shall be managed for all waste streams in decommissioning as prescribed by the Regulation on Management of



Radioactive Waste (NRRC-R-16) and other specific requirements made by the NRRC for the purpose of this regulation.

Chapter 9: Completion of Decommissioning

Section 16: Completion of Decommissioning and Release from Regulatory Control

32. On the completion of decommissioning actions, the licensee shall demonstrate that the end state criteria, as specified in the final decommissioning plan, and the clearance requirements set by the NRRC are fulfilled for a decommissioned part of a nuclear facility, a decommissioned nuclear facility, or the site and any additional regulatory requirements have been met.
33. The buildings and the site of a nuclear facility may be released from regulatory control if the typical annual dose to the most exposed individual arising from the use of the buildings and the site is not more than the dose constraint set by the NRRC.
34. The buildings and the site may be released from regulatory control for restricted use, when the annual dose to the most exposed individual arising from the use of the buildings and the site might exceed the dose constraint set by the NRRC. The restrictions shall be implemented so that compliance with the dose constraint is assured. The compliance with the restrictions shall be demonstrated.
35. The licensee shall design, establish and maintain the appropriate controls and programs for monitoring and surveillance for the optimiza-

tion of protection and safety and for the protection of the environment in the facilities and sites released from regulatory control for restricted use. These controls shall be subject to approval by the NRRC.



Superseded by NRRC-R-10 Rev. 0.1 2024

NRRC-R-10

©Nuclear and Radiological Regulatory Commission , 2022
King Fahd National Library Cataloging-in-Publication Data

L.D. no. 1443/12993

ISBN: 978-603-04-2048-3





Superseded by NRRC-R-10 Rev. 0.1 2024



هيئة الرقابة النووية والإشعاعية

Nuclear and Radiological Regulatory Commission