

NRRC Specific Regulations

Decommissioning of Radiation Facilities

NRRC-R-01-SR15

2023



هيئة الرقابة النووية والإشعاعية
Nuclear and Radiological Regulatory Commission

Specific Regulation

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Preamble

In accordance with the provisions of the Radiation Safety Regulation (NRRC-R-01), approved by the NRRC's Board of Directors in resolution No. (R/1/1/2022), dated 20 April 2022, in chapter (2), section (21), article (58), and Notification on and Authorization of Facilities and Activities with Radiation Sources Regulation (NRRC-R-02), approved by the NRRC's Board of Directors in resolution No. (R/1/1/2022), dated 20 April 2022, in chapter (6), section (11) article (40), this specific regulation provides detailed requirements to support the authorization and safe performance of activities related to the decommissioning of authorized facilities.

This specific regulation has been prepared on the basis of International Atomic Energy Agency (IAEA) standards, as well as the and the international best practices and the experiences of similar international regulatory bodies, and in accordance with the Kingdom's international commitments, and it has been approved by the NRRC's CEO resolution No. 1149, dated 25/4/2023.



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Chapter 1: Objective, Scope, and Definitions

Section 1: Objective

1. The objective of this Specific Regulation is to define the safety requirements and process for the decommissioning of a radiation facility applicable to all aspects of the decommissioning of a facility, including the planning, conduct and completion of decommissioning actions and the termination of the authorization for those actions.

Section 2: Scope

2. This Specific Regulation applies to the decommissioning of all radiation facilities, except facilities for the disposal of radioactive waste, and facilities with X-ray emitting devices.

Section 3: Definitions

Decommissioning

The processes of dismantling and decontamination and the measures taken to release a facility, other than a disposal facility, from the control of the Commission.

Decommissioning plan

A document providing 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 materials subject to restrictions imposed for radiation protection and safety purposes.

Unrestricted use

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



Chapter 2: General Responsibilities of the Authorized Person

Section 4: Responsibilities of the Authorized Person .

3. The authorized person shall have the overall responsibility for decommissioning of its facilities.
4. The prime responsibility for safety during the decommissioning of a facility shall remain with the authorized person. To this end, the authorized person shall be responsible for all aspects of safety and radiation protection of workers, public and environment during the decommissioning activities fulfilling the related requirements for planned exposure situations as specified in the Regulation on Radiation Safety (NRRC-R-01) and other relevant regulations.
5. For the decommissioning of a facility, the authorized person shall:
 - a. Define a decommissioning strategy.
 - b. Prepare and maintain a decommissioning plan throughout the lifetime of the facility.
 - c. Submit the decommissioning plan and its update for review and approval by the NRRC.
 - d. Perform safety assessments and environmental impact assessments in support of decommissioning actions.
 - e. Request an authorization by the NRRC to perform the decommissioning actions.
 - f. Provide financial assurances and resources to cover the costs

associated with safe decommissioning, including management of the resulting radioactive waste.

- g. Notify the NRRC prior to terminating the activity or shutting down the facility permanently.
- h. Ensure that individuals performing decommissioning actions have the necessary skills, expertise and training to perform decommissioning safely.
- i. Ensure the safety management of the remaining operational waste from the facility and all waste from decommissioning.
- j. Ensure that the facility is maintained in a safe configuration during the period of transition following permanent shut-down and until the approval of the final decommissioning plan.
- k. Perform radiological surveys in support of decommissioning.
- l. Verify that end state criteria have been met by performing a final survey.
- m. Keep and retain records and submitting reports as required by the NRRC.
- n. Ensure that records from all stages of the lifetime of the facility, including its siting, design, construction, commissioning, operation, and decommissioning that are of importance for the planning and conduct of decommissioning are identified, preserved and made available when necessary.



- o. Ensure that decommissioning strategy and supporting documents, including relevant records and report, are provided to interested parties when required by the NRRC.
- 6. The authorized person can delegate the performance of specified decommissioning actions to contractors.

Section 5: Integrated Management System for Decommissioning

- 7. The authorized person shall establish and implement an integrated management system that, among other:
 - a. Includes provisions for the arrangements and processes necessary to address the goals relevant to decommissioning;
 - b. Facilitates the planning and implementation of decommissioning actions;
 - c. Ensures the safe conduct of decommissioning; and
 - d. Ensures the transfer of responsibilities for decommissioning if necessary.
- 8. The authorized person shall establish a safety policy applicable to the decommissioning of facilities that promotes a strong safety culture and sets out the responsibility of all individuals to identify and to bring any safety concerns to the attention of management of the decommissioning project.

Chapter 3: Decommissioning Strategy and Planning

Section 6: Decommissioning Strategy

9. The authorized person shall:
- a. Select a decommissioning strategy consistent with the national policy on the management of radioactive waste and in line with the relevant regulatory requirements, that will be the basis for the decommissioning planning.
 - b. Demonstrate that, for the selected strategy:
 - i. The facility will be maintained in a safe configuration at all times;
 - ii. The facility will be adequately decommissioned in the future; and
 - iii. No undue burdens will be imposed on future generations.
10. The preferred decommissioning strategy shall be immediate dismantling, and the release from regulatory control without restrictions shall be the preferred decommissioning end state.
11. The authorized person shall justify the need for implementing a deferred dismantling strategy.
12. For sites with more than one facility, a site strategy for decommissioning shall be developed to ensure that interdependences between the facilities are taken into account in the planning for individual facilities that will lead to final decommissioning plans for each facility.



13. If the permanent 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.

Section 7: Decommissioning Planning

14. The authorized person shall apply a graded approach to all aspects of the decommissioning process consistent with the magnitude of the possible radiation risks arising from the decommissioning.
15. The authorized person shall prepare and maintain a decommissioning plan throughout the lifetime of the facility to ensure that decommissioning can be accomplished safely and meet the defined end state.
16. For a new facility, the responsible person shall ensure that decommissioning planning begins early in the design stage and continues until the termination of the decommissioning authorization.
17. The responsible person shall prepare and submit to the NRRC an initial decommissioning plan supporting the application for authorization at pre-operational or operational phases of the facility as specified in the Notification on and Authorization of Facilities and Activities with Radiation Sources (NRRC-R-02).
18. The initial decommissioning plan under paragraph 15 of this Regulation shall:
 - a. Identify the available decommissioning options and their relationship with the design, construction and operation of the installation;

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- b. Demonstrate the feasibility of decommissioning;
 - c. Prove that sufficient financial resources will be available for decommissioning; and
 - d. Identify categories and estimate quantities of waste that will be generated during decommissioning.
 19. The decommissioning plan shall be reviewed, revised as necessary, and submitted to the NRRC for approval in case of the following:
 - a. A renewal of the facility authorization is requested.
 - b. An accident occurs, or a situation arises with an impact on decommissioning.
 - c. Specific circumstances warrant, including significant changes in operational processes and procedures.
 20. The authorized person shall update decommissioning plan, as necessary, considering the following:
 - a. The relevant operational experience gained;
 - b. The lessons learned from the decommissioning of similar facilities; and
 - c. New or revised safety requirements, or technological developments relevant to the selected decommissioning strategy.
 21. Prior to starting the decommissioning actions, the authorized person shall prepare a final decommissioning plan and submit it to the NRRC



for approval, even when the facility undergoes a sudden or unintended shutdown.

22. The final decommissioning plan and supporting documents shall be developed in accordance with the NRRC requirements. These documents shall cover at least the following:
 - a. The selected decommissioning strategy;
 - b. The decommissioning schedule;
 - c. The type and sequence of decommissioning actions;
 - d. The applied waste management strategy, including the actions to ensure the safe management of any remaining operational waste when necessary;
 - e. The proposed end state and how the authorized person will demonstrate that the end state has been achieved;
 - f. The storage and disposal of the waste from decommissioning;
 - g. The decommissioning timeframe; and
 - h. The financing for the completion of the decommissioning.

23. In preparing the final decommissioning plan, the authorized person shall ensure that:
 - a. The decommissioning techniques are selected in away that the protection and safety are optimized;
 - b. Protection of the environment is ensured;

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- c. The generation of waste is minimized; and
 - d. Any potential negative impact on the storage and disposal of waste is minimized.
24. If deferred dismantling has been selected as a decommissioning strategy, the authorized person shall submit for the NRRC's approval the decommissioning plan describing the provisions to ensure the following:
- a. Safety will be warranted throughout the period of deferral by implementing the appropriate program for maintenance, monitoring and surveillance.
 - b. The selected strategy will be implemented safely.
 - c. The availability of adequate financial resources to ensure that the facility will be maintained in a safe condition during the deferral period and for subsequent decontamination and/or dismantling.
25. During the preparation and updating of the final decommissioning plan, the extent and type of radioactive material at the facility (e.g. activated and contaminated structures and components) 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 (and/or in subsurface soils and groundwater), such radioactive material shall be included in the characterization survey. Additional characterization

of the site for the purpose of evaluating and preventing the potential migration of radionuclides shall be considered.

26. The final decommissioning plan shall be supported by:
- a. An appropriate safety assessment covering the planned activities and abnormal events that may occur during decommissioning. The assessment shall address amongst others occupational exposures and potential releases of radioactive substances with resulting exposure of the public.
 - b. Arrangements to ensure compliance with relevant NRRC regulations. The concerned provisions shall be addressed, among others, by a dedicated radiation protection program, security, and emergency plans.
27. If the shutdown of the facility is caused by an accident, the authorized person shall ensure that the facility is brought to a safe configuration before an approved final decommissioning plan is implemented.

Chapter 4 : Financing of Decommissioning

Section 8: Financing of Decommissioning

28. The authorized person shall:
- a. Present the cost estimate for the decommissioning, including the management of the resulting radioactive waste, in the decommissioning plan.

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- b. Cover the cost for the decommissioning in line with the applied decommissioning strategy and plan.
 - c. Update the cost estimate for the decommissioning on the basis of the periodic update of the initial or the final decommissioning plan.
29. When requested by the NRRC, the authorized person shall establish a mechanism to ensure financial resources which shall be:
- a. Consistent with the cost estimate for the decommissioning.
 - b. Dedicated, and not used for other purposes.
30. When requested by the NRRC, the authorized person shall change the mechanism used to provide financial assurance.
31. If the decommissioned facility is to be released with restrictions on its future use, the authorized person shall ensure the availability of adequate financial resources for the monitoring, surveillance and control of the facility as specified by the NRRC.
32. The authorized person shall ensure that planned financial resources are available to cover the costs involved with safe decommissioning, including waste management.

Chapter 5 : Conduct of Decommissioning Actions

Section 9: Implementation of Decommissioning plan

33. The authorized person shall implement the decommissioning actions

in compliance with the approved final decommissioning plan and the related license terms and conditions.

34. In case the decommissioning actions are conducted by contractors, the authorized person shall ensure the necessary provisions to oversight the activities performed by the concerned contractor.
35. In case of deferred dismantling, the authorized person shall:
 - a. Ensure that the facility has been placed, and will be maintained, in a safe configuration and will be appropriately decommissioned in the future.
 - b. Submit to the NRRC the surveillance program for approval.
 - c. Submit to the NRRC the maintenance program for reference and record.
36. During decommissioning, the authorized person shall keep an up to date list of structures, systems and components important for ensuring protection and safety.
37. The authorized person shall establish and maintain emergency planning arrangements, commensurate with the associated hazards.

Section 10: Management of Radioactive Wastes

38. The authorized person shall ensure that:
 - a. Radioactive waste management is performed in compliance

with the relevant provisions described in the final decommissioning plan and the related license terms and conditions.

- b. All efforts are made to remove and dispose, prior to starting decommissioning actions, radioactive waste arising from operational activities that remains at the facility after its permanent shutdown. In case such removal is not possible the approved final decommissioning plan shall address the safe storage and subsequent removal of these materials as part of decommissioning.
- c. Radioactive waste that is generated during decommissioning shall be disposed conforming to the national waste management policy and strategy.

Chapter 6 : Completion of Decommissioning Actions and Termination of the Authorization for Decommissioning

Section 11: Completion of Decommissioning

39. On the completion of decommissioning actions, the authorized person shall:
- a. Demonstrate that the end state criteria, as specified in the final decommissioning plan, and any additional regulatory requirements have been met.
 - b. Prepare a decommissioning completion report based on criteria specified by the NRRC and submit it to the NRRC for approval.



- c. Establish a record-keeping system, in line with the integrated management system and the relevant regulations, to ensure that the new users of the site after its release from the regulatory control are informed about the presence of a facility on the site in the past, and the nature of the activities that were conducted at the site.

Section 12: Termination of the Authorization for Decommissioning

40. The authorized person shall request for termination of the authorization and on the release of the facility and/or site from regulatory control as specified in the Regulation on Notification on and Authorization of Facilities and Activities with Radiation Sources (NRRC-R-02).
41. If the approved decommissioning end state is the release from the regulatory control with restrictions on the future use of the remaining structures, the authorized person shall design, establish and maintain the appropriate controls and programs for monitoring and surveillance for the optimization of protection and safety and for the protection of the environment. These controls shall be subject to the NRRC's approval.

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