

# National Nuclear Regulator



## Requirements Document

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RD-0026	Decommissioning of Nuclear Facilities	0

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Date of issue

Next Revision

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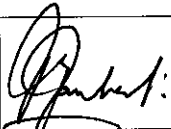
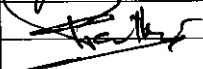

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Chief Executive Officer

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### APPROVAL RECORD

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Recommended for approval By	G.A Clapison	Acting Assessment Coordinator: Assessment Group		30/04/08


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Rev No.	Date Approved	Nature of Revision	Prepared by
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## 1. Introduction

In terms of section 20, subsections 1 and 3 of the National Nuclear Regulator Act, Act No. 47 of 1999 [1], no person may decommission a nuclear installation or any action or facility which is capable of causing nuclear damage except under the authority of a nuclear installation licence or under the authority of a certificate of registration.

The decommissioning of facilities in South Africa must be undertaken within defined boundaries to ensure the safety of workers, the public and the environment. The general requirements that must be satisfied for safe decommissioning activities are outlined in section 5 of the Regulations on Safety Standards and Regulatory Practices published as Regulation no. R388 dated 28 April 2006 (hereinafter referred to as RSRP) [2], and this Requirements Document is based on the RSRP.

## 2. Purpose

To provide the NNR regulatory requirements in more details in order to complement section 5 of the RSRP with regard to decommissioning of facilities associated with nuclear and radioactive material.

## 3. Scope of document

The document applies to all facilities/actions regulated by the NNR.

## 4. Definitions

**Clearance** means removal of radioactive materials or radioactive objects within actions authorized by a nuclear installation license, nuclear vessel license or certificate of registration from any further control by the Regulator

**Decommissioning** means administrative and technical actions taken to allow the removal of all of the regulatory controls from a facility (except for a repository which is closed and not decommissioned)

**NNR** means the National Nuclear Regulator

**Nuclear authorisation** means a nuclear installation licence, nuclear vessel licence, certificate of registration or certificate of exemption.

**Radioactive waste** means any material, whatever its physical form, remaining from an action requiring a nuclear installation licence, nuclear vessel licence or certificate of registration and for which no further use is

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foreseen, and that contains or is contaminated with radioactive material and does not comply with the requirements for clearance

**Release of land** means the removal of land from regulatory control

**RSRP** means the Regulations on Safety Standards and Regulatory Practices published as Regulation no. R388 dated 28 April 2006

## 5. Protection of human health and the environment

- (1) A Radiation Protection Programme must be designed and put in place to ensure that all radiological exposures associated with decommissioning activities are identified and quantified with a view to implement control measures to ensure compliance with the dose limits.
- (2) The dose limits for the exposure of workers and the public must be complied with, including the relevant dose constraint.
- (3) Clearance for material and equipment must comply with exemption criteria [2], if that is not possible; the levels must be derived and justified for consideration by the Regulator on a case-by-case basis.
- (4) The release of land from regulatory control must comply with the RSRP.[2]
- (5) The safety assessment must be conducted to demonstrate compliance with regulatory requirements for the workers, the public and the environment under normal operating conditions and under accident conditions.
- (6) A safety culture must be maintained through training to appropriate levels of awareness of health, safety and environmental matters
- (7) An environmental radiation protection program must be maintained during the decommissioning process and beyond if required.
- (8) The decommissioning activities must comply with all applicable principles and requirements in the RSRP [2].

## 6. Decommissioning strategy

- (9) A decommissioning strategy, consistent with the RSRP [2] and the national waste management policy and strategy [3] must be submitted as part of conceptual decommissioning plan from the design phase and must be updated throughout the operation of the authorised action as a basis for a detailed decommissioning plan.

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- (10) Decommissioning options may range from dismantling to redevelopment and reuse. If immediate decommissioning is not possible, deferred decommissioning must be justified, taking into consideration waste management, availability of workforce, availability of funds, technical feasibility, and optimisation of protection. The different decommissioning options may be implemented in phases where appropriate.
- (11) The decommissioning strategy must include provisions to ensure that, if termination of operations is required for planned or unplanned reasons before the final decommissioning plan is prepared, adequate arrangements are provided to ensure the safety of the facility until a satisfactory decommissioning plan can be approved by the NNR and implemented by the holder of an authorization.
- (12) Appropriate means (i.e. skill and technology) must be available to manage all categories of waste during decommissioning and thereafter if required.
- (13) The safety impact of the decommissioning activities such as decontamination, cutting and handling of large equipment, dismantling and removal of some safety systems must be assessed and managed such that the hazards are mitigated and are within acceptable limits and constraints.
- (14) Re-use and recycling of materials and equipment including re-use and alternate use of buildings and land must be considered
- (15) For sites with multi-nuclear facilities, an overall decommissioning strategy must be prepared to ensure that interdependencies are taken into account during the planning for individual facilities.

## **7. Decommissioning plan**

- (16) The decommissioning plan must be developed for each facility and such a plan must be submitted to the NNR for review and approval. The type of information and the level of detail in the plan must be commensurate with the hazards posed by the facility. A graded approach must be applied in developing the decommissioning plan.
- (17) Where phased decommissioning is to be implemented, all the different phases of decommissioning must be identified and included in the plan and a separate authorization must be obtained for each phase.
- (18) A conceptual decommissioning plan must be prepared during the planning and design phases for new nuclear facility or as early as possible for existing facilities. The operator must submit the conceptual plan as part of an application to the NNR for an

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authorization to operate the facility. The plan must be reviewed and updated periodically, and when circumstances such as operational process changes, which can result in significant changes for the decommissioning activities and costs. Revisions must be considered in the light of operational experience and events, new or revised safety requirements or technological developments. If an emergency occurs, the decommissioning plan must be reviewed and modified as necessary.

- (19) If deferred dismantling strategy has been chosen, it must be demonstrated by the holder of the authorization in the decommissioning plan that such an option is safe and will be safely performed in future (Care and maintenance requirements). There should be a justification to demonstrate that no undue burdens are imposed on future generations and that those future requirements for information, technology and resources have been taken into account.
- (20) A detailed safety assessment must be incorporated as justification for the safety of workers and the public and protection of the environment to demonstrate compliance with the regulatory requirements.
- (21) The authorization holder must determine the extent and type of radioactive material and contamination levels through a detailed characterization survey and that must be included in the decommissioning plan.
- (22) The decommissioning plan must demonstrate how waste will be classified and managed during and after decommissioning. If required, must include what additional controls will be required for waste management storage or disposal.
- (23) Decontamination and dismantling techniques must be chosen that minimize exposure of workers, the generation of waste and airborne contamination.
- (24) The decommissioning plan must include procedures to demonstrate that all chemicals will be managed safely, that the following appropriate programs have been implemented, radiation protection programme; and environmental surveillance programme; waste management programme, quality assurance programme; emergency preparedness and response; general health and safety; fire protection; physical security and safeguards.
- (25) The decommissioning plan must include the derivation of clearance and release levels applicable to materials, equipment and land and how compliance with these levels is to be demonstrated with final surveillance.



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- (26) The decommissioning plan must address how the administrative and procedural controls, the limiting conditions of operation and the safety programmes identified during safety assessment will be implemented.
- (27) When it has been decided to permanently terminate operations in a facility, a final decommissioning plan including all new amendments must be prepared and submitted to the NNR for approval prior to implementation, as a basis for authorization of specific actions or phase of decommissioning.

### **8. Funding**

- (28) Funding for decommissioning must be considered during initial planning at the design phase for the facility.
- (29) Funds must be available for decommissioning at any time when needed from startup to termination of period of responsibility for the facility.
- (30) The amount of money available must be periodically reviewed to take into consideration the cost of decommissioning associated with the particular processes implemented and the associated waste.
- (31) The possible re-use or alternate use and the value of the property must be considered during decommissioning subject to regulatory review and approval.
- (32) The cost of additional, after decommissioning controls, such as waste storage or care and maintenance requirements, must be considered.

### **9. Decommissioning management**

- (33) An authorization applicant or holder must establish a decommissioning management and implementation organization with the responsibility to ensure that decommissioning will be conducted safely. The reporting hierarchy and lines of authority must be such that they do not create conflicts and confusion that could compromise safety during decommissioning. There must be a clear delineation of responsibilities between participating organizations.
- (34) The decommissioning activities must be controlled using procedures and work instructions. Such procedures and work instructions may be requested by the NNR for review and approval to ensure safety and practicability.

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- (35) A comprehensive quality assurance programme must be applied to all decommissioning phases and all elements of decommissioning management.
- (36) The ultimate responsibility for safety lies with the operator. Therefore contractors must be managed accordingly to ensure an acceptable level of safety and awareness.
- (37) Personnel associated with decommissioning activities must be suitably trained, qualified and competent to perform all required activities in accordance with approved procedures.

## **10. Decommissioning implementation**

- (38) The holder of the authorization must implement the decommissioning and related waste management activities in compliance with the RSRP and national waste policy and strategy in accordance with the approved decommissioning plan.
- (39) Only activities authorized in the decommissioning plan may be performed, and where implementation is in phases, only approved phases may be implemented.
- (40) Throughout the decommissioning process an adequate level of safety must be maintained through the implementation of appropriate safety procedures, application of good engineering practices, ensuring that staff is properly trained and qualified, provision of the appropriate equipment and keeping of records as specified.
- (41) Decommissioning techniques and equipment must be chosen such that protection of the workers and the public is optimized. The impact of tasks must be assessed before it is performed.
- (42) Emergency preparedness and response arrangements must be in place.
- (43) Processes must be optimized to produce the minimum amount of waste. Waste and equipment must be appropriately classified and managed to make provision for re-use and recycling.
- (44) Where required, a care and maintenance programme as approved by the NNR must be implemented and maintained.
- (45) The off-site transport of radioactive material or any equipment or objects contaminated with radioactive materials during decommissioning must be carried out in terms of the provisions of the IAEA Regulations for the Safe Transport of Radioactive Material.

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## 11. Completion of decommissioning

- (46) On completion of decommissioning, and before the authorization holder can be relieved of further responsibility for the facility, the authorization holder must demonstrate to the NNR that the end point criteria as defined in the decommissioning plan and any additional regulatory requirements have been met.
- (47) A clearance surveillance programme that has been approved as part of the decommissioning plan must be implemented
- (48) The operator must demonstrate that the release of land and buildings as appropriate, satisfy the release criteria approved as part of the decommissioning plan
- (49) The authorization holder must submit the final decommissioning report that demonstrates satisfaction of the end criteria to the NNR for review.
- (50) If the facility is redeveloped and reused after decommissioning, it becomes a new facility and a revised or new authorization is necessary and the operator must apply for an authorization.
- (51) If the facility cannot be released for unrestricted use, appropriate care and maintenance must be identified and maintained to ensure protection of human health and the environment. The controls must be approved by the NNR and the authorization holder must define clear responsibility for care and maintenance of t the facility.
- (52) All records generated during the implementation of the decommissioning plan must be maintained in accordance with the records retention requirements of the quality assurance programme and the NNR requirements

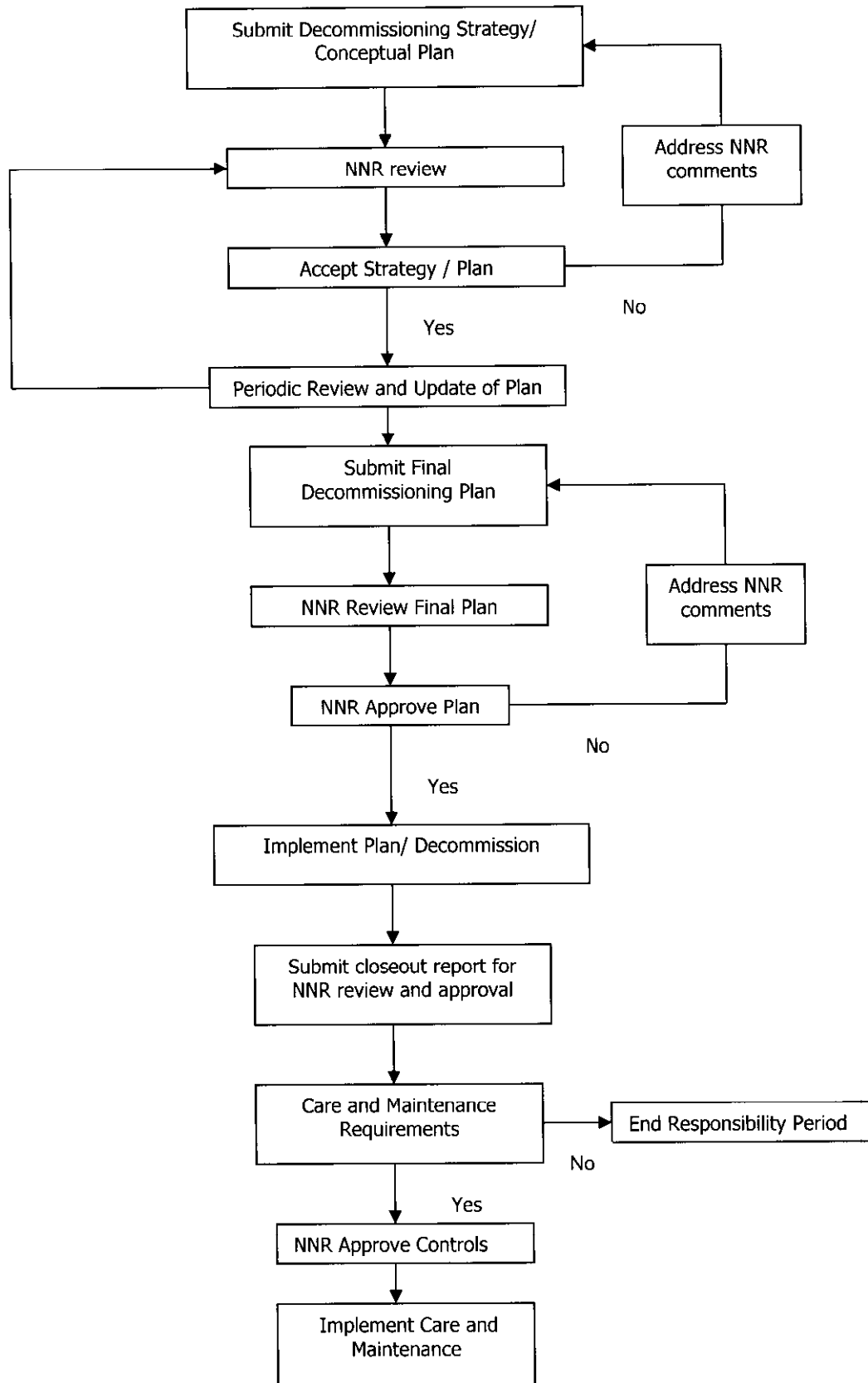
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## 12. References

1. National Nuclear Regulator Act, 1999 (Act No. 47 of 1999)
2. NNR Regulations No. R. 388 on Safety Standards and Regulatory Practices, 28 April 2006
3. Radioactive Waste Management Policy and Strategy for the Republic of South Africa, (2005).
4. INTERNATIONAL ATOMIC ENERGY AGENCY, the Principles of Radioactive Waste Management, Safety Series No. 111-F, IAEA. Vienna (1995).
5. INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of Radioactive Waste, Including Decommissioning, Safety Requirements No. WS-R-2, IAEA (2000).
6. INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Nuclear Power Plants and Research Reactors, Safety Guide No. WS-G-2.1, IAEA (1999).
7. INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Facilities Using Radioactive Material, Safety Requirements No. WS-R-5, IAEA (2006).
8. Procedure for the Preparation, Review, Approval, Issuance, Control and Revision of NNR Documents, AD 1039 Rev 2 Final.

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### Appendix A. Decommissioning Flow chart



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