

# NATIONAL NUCLEAR REGULATOR

## Position Paper

PP-0009

AUTHORISATIONS FOR NUCLEAR INSTALLATIONS

REV 0



*For the protection of persons, property and  
the environment against nuclear damage*

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# 1 Introduction

The National Nuclear Regulator Act [1] (hereafter referred to as the Act) makes provision for the granting of nuclear authorisations. Nuclear Authorisation is defined in section 1 (xiv) of the Act as a (1) nuclear installation licence, (2) nuclear vessel licence, (3) certificate of registration or (4) certificate of exemption and therefore makes provision for the granting of four categories of nuclear authorisations.

Section 2 (1) (a) of the Act makes provision for the siting, design, construction, operation, decontamination, decommissioning and closure of any nuclear installation.

Section 20 (1) of the Act states that *“No person may site, construct, operate, decontaminate or decommission a nuclear installation, except under the authority of a nuclear installation licence”*.

The siting, design and construction of nuclear installations on their own do not pose any radiological risk to the public, workers or environment, until such time as nuclear material is brought onto the site or where these activities may have an impact on the safety of existing nuclear installations, or in the case in which there are development restrictions in the vicinity of such nuclear installations or any other action involving radioactive material. In the case of a potential safety impact on existing facilities or actions a safety assessment is required to be undertaken by the holders.

Whilst design of a nuclear installation or the manufacturing of components are not expressly prohibited in terms of section 20 of the Act, it is clear from section 5 that any person wishing to make use of a design of a nuclear installation or of components so manufactured in an eventual authorised nuclear installation must have performed these activities in terms of a nuclear authorisation.

Taking full cognizance of its mandate, and depending on the application, the NNR could issue the following types of authorisations for nuclear installations:

- (a) Nuclear Installation Licence (NIL) to site, construct and/or operate or decommission or decontaminate the installation, or
- (b) Nuclear Installation Site Licence (NISL)<sup>1</sup> for new nuclear installations
- (c) Authorisation<sup>2</sup> to Design a nuclear installation, or
- (d) Authorisation to Manufacture components.

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<sup>1</sup> The NISL would consider enveloping characteristics of a nuclear installation contemplated to be constructed on the site while a NIL to site, construct and/or operate would be for a specific nuclear installation design

<sup>2</sup> PP-0008 currently uses the term NIL to design. PP-0008 will be updated upon approval of this document.

## 2 Purpose

The purpose of this document is to:

- (a) Clarify the NNR position with respect to the issuance of authorisations relating to nuclear installations;
- (b) Describe the types of nuclear authorisations, and
- (c) Elaborate on applicable requirements contemplated for each type of authorisation.

## 3 TERMS, DEFINITIONS AND ABBREVIATIONS

### 3.1 Terms & Definitions

Construction<sup>3</sup> – Those actions required to assemble components, parts, and appurtenances to functional units at site. Those actions may include forming, machining, assembling, welding, brazing, heat treating, examination, testing, inspection, and certification of manufactured products as well as activities associated with civil works such as driving of piles, subsurface preparation, placement of backfill, concrete, or permanent retaining walls within an excavation, installation of foundations and erection of civil structures or dismantling of existing civil structures. Construction, in the context of the Act, does not include design and manufacturing of products.

Manufacturing – Those actions required to manufacture source material, components, parts and appurtenances. These actions may include forming, machining, assembling, welding, brazing, heat treating, examination, testing, inspection, and certification.

Prior safety assessment<sup>4</sup> – means a safety assessment undertaken prior to the issuance of a nuclear authorisation, refer to [2];

Place bound<sup>5</sup> – means directly supporting the functions associated with the siting, design, construction, operation and decommissioning of a nuclear installations on the demarcated site for which an authorisation has been granted.

Site (noun) – means a site<sup>6</sup> which has a defined boundary and is under effective control and on which:

- (a) a nuclear installation is situated or is being constructed; or

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<sup>3</sup> The RD-0034 definition for construction distinguishes between construction and manufacturing. The definition does however not explicitly refer to civil works. The NNR Act clearly uses construction in the context of civil construction as well as erection and assembling of other components on site. RD-0034 should be updated in this regard.

<sup>4</sup> The definition has been changed from the one in the SSRP as safety assessments are required for all authorisation stages. The SSRP definition will be updated as part of the review of the Regulations

<sup>5</sup> Definition adapted from draft regulation on developments around Koeberg.

<sup>6</sup> The site should be defined by a boundary and be under effective control.

(b) any action which is capable of causing nuclear damage, is carried out;

Site – In the context of “to site a nuclear installation”, is the actual placement of the nuclear installation on the site (noun), including pre-construction activities associated with the preparation of the site (noun) for construction of the nuclear installation.

Siting – Is the process of selecting a suitable site for a nuclear installation, including appropriate assessment of site characteristics/hazards and definition of the related site parameter envelop. Siting involves all activities referred to in the regulation on siting including data collection, analysis, monitoring, as well as site establishment and early site activities.

### **3.2 Abbreviations**

NIL	Nuclear Installation Licence
NISL	Nuclear Installation Site Licence
NNR	National Nuclear Regulator
SSRP	Regulations on Safety Standards and Regulatory Practices

## **4 Multi-Stage or Combined Licensing**

The interpretation of the Act is that in order to operate a nuclear installation, the siting, design, manufacturing and construction stages (as well as the operation and decommissioning) must be done under the regulatory control of the NNR. The applicant has two options to pursue, viz:

- (i) A multi-stage approach to licensing for the various stages or combinations of stages of the nuclear authorisation may be adopted. Each stage requires a safety assessment to address the aspects that have an impact on the safety for the proposed installation as an entity and holistically. Depending on the scope and rigor of the safety assessment, the NNR may grant a licence as contemplated in Section 1 with conditions attached to it for activities commensurate with those adequately addressed in the safety assessment. These conditions may be varied at later stages when the safety assessment basis is fully developed.
- (ii) Authorisation for a licence covering siting, construction and operation may be obtained. For this the safety assessment submitted in support of the application must cover the full scope of design, siting, construction, manufacturing, operation and decommissioning stages. The NNR assessment and inspection processes cover the same.

If necessary an early intervention process will be initiated to ensure proper regulatory control over these early stages. Under no circumstances may construction of a nuclear installation or parts thereof take place without an authorisation which covers construction.

## 5 Nuclear Installation Licence (NIL)

Section 5 (b) of the Act grants the NNR powers to, amongst others, exercise regulatory control related to safety over the siting, design, construction, operation, manufacture of component parts, and decontamination, decommissioning and closure of nuclear installations, through the issuing of nuclear authorisations.

Section 20 (1) of the Act states that: “No person may site, construct, operate, decontaminate or decommission a nuclear installation, except under the authority of a nuclear installation licence.” In terms of the provisions this section the siting, construction, operation, decontamination or decommissioning of any nuclear installation as defined in section 1(xviii) of the Act must be authorised by way of a nuclear installation licence (NIL) granted by the NNR.

Section 21 (1) furthermore requires that any person wishing to site, construct, operate, decontaminate or decommission a nuclear installation may apply in the prescribed format to the Chief Executive Officer of the NNR for a nuclear installation licence and must furnish such information as the NNR Board of Directors requires.

Section 23 (2) states that the Chief Executive Officer may impose any condition deemed necessary to fulfill the mandate of the Regulator.

Application for the granting of a nuclear installation licence must be made to the Chief Executive Officer of the NNR in the prescribed format [7] and the applicant must provide such information as the Board of Directors of the NNR may require.

The SSRP [2] further requires that a prior safety assessment must be performed. The process and outcome of the safety assessment must be documented in the form of a safety case. A detailed safety case specification must be agreed with the NNR prior to the submittal of the safety case in support of the application.

### 5.1 NIL to site or construct a nuclear installation

For a NIL to site or construct a nuclear installation it is important that the NNR is provided with sufficient information, in the form of a safety case [10], covering the full technical safety basis, to enable the NNR to perform a detail assessment to the extent possible and therefore determine whether the proposed design will meet the requirements and that all safety issues identified during the safety case review will be mitigated at the appropriate stage of the licensing process. In so doing the NNR will formulate its position whether to grant or refuse the nuclear installation licence application to site or construct. This will also take into consideration all the public comments emanating from the public participation process.

Once the decision is taken to grant a NIL to site or construct, the NNR may impose in terms of section 23 of the Act specific conditions related to the respective stage such as mandatory hold and/or witness points beyond which work must not proceed without the approval of the NNR. These hold and/or witness points, depending on the type of installation and the associated nuclear risk as well as the completeness of the safety assessment, could be for important steps such as:

- Site establishment
- Early site activities
- Component manufacturing (Otherwise authorised under an Authorisation to Manufacture)
- Carrying out of civil works
- Installation of components and equipment
- Performance of pre-commissioning or functional tests of individual subsystems of components
- Cold commissioning testing up to and including non-nuclear integrated tests
- Hot commissioning testing (including nuclear material on site, loading of nuclear material, initial criticality, low power testing, full power testing)

For subsequent licensing stages the applicant will request a variation (amendments to the conditions) to this NIL supported by the relevant information. Subject to the NNR review of the submitted documents, the conditions of the NIL will be amended for the specific stage of licensing and a variation of the NIL will be issued to the applicant.

## **5.2 NIL for the operation of a nuclear installation**

Safety assessment documentation (i.e. a safety case) must accompany and support the application for a variation to the NIL. The safety case for a NIL to operate must consider the results of the commissioning testing and should address all outstanding issues. Subject to the NNR review, the conditions of the NIL will be amended to allow for the operation of the nuclear installation and a variation of the NIL will be issued to the applicant.

Although nuclear authorisations may be different for different types of nuclear installations typical conditions of authorisations will be related to:

- A valid description of the installation
- Modification control procedure of safety related aspects
- Maintaining a valid and up-to-date safety case.
- Limits on operation and use (such as dose or discharge limits or limits on the duration of the authorization)
- Separate authorizations that the operator is required to obtain from the Regulator
- Establishment and compliance with operating technical specifications
- Maintenance and inspection program



- Operational radiation protection program
- Waste management program
- Transport of radioactive material
- Emergency plan where applicable
- Security plan
- Routine reporting
- Occurrence and incident reporting
- Record management
- Quality and safety management programme

### **5.3 NIL for the decontamination and/or decommissioning of a nuclear installation**

At the end of its operating lifetime, the nuclear installation should enter post-operational decontamination and reduction of hazards to move towards a more passively safe state. A decommissioning strategy and plan must be included in the prior safety assessment for this stage of the lifecycle of the nuclear installation. An updated, detailed final decommissioning plan and its supporting safety assessment has to be submitted by the licensee to the NNR for acceptance, prior to commencement of dismantling activities in support of the application for the variation of the NIL to decontaminate and/or decommission a nuclear installation. The decommissioning plan must specify any institutional controls that are required to maintain radiation safety after termination of the period of responsibility of the holder consistent with NNR standards [2] and requirements [5]. The nuclear installation will remain licensed throughout the period of decommissioning, with appropriate safety measures maintained by the licensee and with appropriate regulatory control by the NNR.

Subject to the NNR review, the conditions of the NIL will be amended for the decommissioning and/or decontamination of the nuclear installation and a variation of the NIL will be issued to the applicant with mandatory hold and witness points and conditions of authorisation relating to amongst others decommissioning management, implementation, reporting and the period of responsibility.

## 6 Nuclear Installation Site Licence for new nuclear installations (NISL)

Applications for a NISL and a NIL initiate separate but similar licensing processes. A NISL considering multiple nuclear installations once granted, cannot be varied into a NIL. If a NISL considering multiple nuclear installations has been granted, a separate application for a NIL must still be granted.

Appendix A lists the various activities and the type of authorisation that would be required as a **minimum** before they can commence. The nuclear authorisation will specify the activities that are allowed.

**Note:** The NISL [3] would typically consider enveloping characteristics of all the nuclear installations contemplated to be constructed on the site while a NIL to site, construct and/or operate would be for a specific nuclear installation or reactor design at a specific site.

A NISL is therefore effectively a statement that the relevant siting factors (including external hazards) have been appropriately characterised to address all safety issues and that the site parameter envelope has been adequately quantified considering the impact and risk to the public from all nuclear installations planned on the site and in the vicinity of the site. The site would therefore be acceptable for future construction of nuclear installations conforming to the range of technologies specified in the application and other conditions specified in the licence.

On this basis a Nuclear Installation Licence to site, construct and operate the installation would not be refused on the grounds of external hazard characterisation and range of technologies planned for the site, unless:

- Site or environmental conditions deteriorated in the interim.
- Generic or technological issues come to light which invalidate the safety case.
- Changes in the population density and population distribution may impact on the viability of the emergency plan.

For this purpose, conditions are imposed in the NISL to ensure the ongoing validity of the safety assessment. The NISL would therefore serve to:

- Confirm NNR acceptance of the safety assessment including the Site Safety Report (SSR).
- Impose conditions on the holder to ensure its validity.
- Grant permission for specific, limited site work to proceed.

## **6.1 Site establishment, early site and early construction activities**

The NNR recognises that applicants may want to perform site and non-nuclear construction activities prior to a potential NIL for either construction or operation. The nature of these activities may be considered nuclear activities when there is a clear intent by the party concerned considering the provisions of the Act relating to siting and/or site of a nuclear installation. In terms of the Act no person may site a nuclear installation except under the authority of a nuclear installation licence. The issue to be considered is whether the NNR could, in the absence of a nuclear authorisation, allow these activities to be undertaken prior to the issuance of nuclear licence for the siting or construction.

Nuclear construction per se is not permitted without a NIL for construction. Construction in the context of the Act and RD-0034 includes the carrying out of civil works as well as the assembling of components and parts on site. Excavation and dewatering would be actions required in order to start with the construction of the civil works. These types of activity are therefore clearly construction related and will require a nuclear authorisation as set forth in section 5 herewith and listed in Appendix A.

Site establishment activities would be subject to an application for a NISL or a NIL (whether combined or multi-stage) and an authorisation from the NNR in the form of a permit.

Early site activities would be authorised in terms of a NIL to site or construct and/or operate, or a NISL.

Early construction activities would be authorised in terms of a NIL to site, subject to the following conditions:

- i. An application for authorisation for early construction activities may be submitted as part of a complete application for a NIL for construction.
- ii. The application must include a safety assessment as applicable, a description of the activities requested to be performed, and the design and construction information otherwise required, but limited to those activities, and supporting information demonstrating compliance with functional and design requirements of the portions of the nuclear installation.
- iii. A plan for redress of applicable activities.

## **6.2 Additional considerations related to site activities**

Site establishment, early site activities, early construction or construction activities (place-bound or otherwise) which have potential nuclear safety implications for an existing nuclear installation or proposed installation must be supported by a safety case submitted by the respective holder/applicant of the potentially affected installation or proposed installation.

The design of the nuclear installation must be at a level of detail to allow for the relevant assessments to be made as required by the siting regulations [3].

## **7 Authorisation to Design**

Having regard to section 5 (b) and 20 (1) of the Act, the NNR recognises that, in the exercise of its regulatory control over nuclear installations, there may be circumstances where the NNR may be required to issue an Authorisation to Design a nuclear installation.

The process will be initiated by an application to the NNR for an Authorisation to Design a Nuclear Installation. Depending on the outcome of the review of the requested documentation, inspection and assessment, the NNR will make a decision on whether to issue (or not) an Authorisation to Design. The framework for design assessment is detailed in a separate position paper PP-0008 [9].

The objectives of the design authorisation process are to:

- (i) Allow for engagement with the NNR on a design of the new nuclear installation not previously authorised,
- (ii) Identify and agree on key safety issues, and the proposed technical resolution thereof, through the application of sound system engineering principles and past experience with the aim of demonstrating through robust research, test and qualification that the design will survive all postulated transient and accident conditions or any other process disturbance, without any undue risk to the persons, property and the environment independent of the site or location where the nuclear installation will be operated,
- (iii) Provide for a regulatory decision-making process that is credible, transparent and which carries credit in subsequent licensing stages as the Safety Evaluation Report that is issued will document the NNR position, and the issues that may need to be addressed, comprehensively.

## **8 Authorisation to Manufacture**

Having regard to section 5 (b) and 20 (1) of the Act, the NNR recognises that, in the exercise of its regulatory control over nuclear installations, there may be circumstances where the NNR may be required to issue an Authorisation to Manufacture components requiring long lead time.

The process will be initiated by an application to the NNR for an Authorisation to Manufacture components of a nuclear installation to be built in the Republic of South Africa. Depending on the outcome of the review of the requested documentation,

inspection and assessment, the NNR will make a decision on whether to issue or not an Authorisation to Manufacture components. The framework for this process has been elaborated in a separate position paper on Manufacturing of components for nuclear installations, PP-0012 [11]. An application for construction of the nuclear installation has to be in place and being processed by the NNR as a pre-condition for issuance of an authorization to manufacture components.

The objective of the Authorisation to Manufacture is to allow for the regulatory control related to the manufacturing of components important to safety, i.e. components requiring long procurement and manufacturing schedules, in the absence of a NIL for construction or operation.

If certain activities took place prior to the application without the intervention of the NNR, the applicant would have to provide the necessary supporting documentation. In the case of hold and witness points for manufacturing, the NNR may accept the inspections conducted by another nuclear regulatory authority by prior agreement, or may disallow the use of the manufactured items. To avoid this type of situation, which could place undue pressure on the NNR to accept the initial work, the requirements are communicated to the applicant up front.

## 9 Other considerations

Applications for a NIL for siting, construction and/or operation as well as applications for a NISL are to comply with the publication and public participation processes as contemplated in Section 21 of the Act [1]. Public hearings will be conducted for all new applications. Where an application for a NIL is received for the construction of a nuclear installation on a site with a NISL, the need for public hearing will be determined by the Board of the NNR on a case by case basis.

An application for an Authorisation to Design or to Manufacture is **not** required to comply with the publication and public participation processes contemplated in Section 21 of the Act.

Nuclear authorisations of any form obtained from the NNR do not relieve the applicant from provisions of other applicable legislations.

## 10 References

- [1] “Act No. 47 of 1999: National Nuclear Regulator Act, 1999”, published in Republic of South Africa Government Gazette, Vol. 414, No. 20760, 23. December 1999.
- [2] Regulations in terms of section 36, read with section 47 of The NNR Act, on Safety Standards And Regulatory Practices, R388, Government Gazette 28755 April 2006
- [3] Regulations in terms of section 36, read with section 47 of the NNR Act (Act No. 47 Of 1999), on The Licensing of Sites for New Nuclear Installations, Government Gazette 34735, 11 November 2011
- [4] RD-0024: Requirements on Risk Assessment and Compliance with Principal Safety Criteria for Nuclear Installations.
- [5] RD-0026: Decommissioning of Nuclear Facilities
- [6] RD-0034: Quality and Safety Management Requirements for Nuclear Installations
- [7] Regulations in Terms Of Section 47, Read With Sections 21 and 22 Of The National Nuclear Regulator Act, 1999, on the format for the application for a nuclear installation licence or a certificate of registration or a certificate of exemption
- [8] IAEA Safety Glossary, Terms used in Nuclear safety and Radiation protection, 2007 Edition
- [9] PP-0008: Design Authorisation Framework, NNR, 2010
- [10] LG-1041: Licensing Guide on the Safety Assessments of Nuclear Power Reactor Sites, Rev 0
- [11] PP-0012: Manufacturing of components for nuclear installations, Rev 0

### Appendix A: Activity vs Minimum Nuclear Authorisation

Stage	Activity	Minimum Nuclear Authorisation required	Comment
1 (a)	Site establishment: <ul style="list-style-type: none"> <li>• Establishment on site of a security infrastructure</li> <li>• Temporary construction support buildings</li> <li>• Site clearance</li> </ul>	Authorisation required in the form of a permit.	Mandatory  Application for site establishment activities can be submitted by an applicant for a NIL or a NISL
1 (b)	Early Site Activities: <ul style="list-style-type: none"> <li>• Initial earthworks and site leveling (terrace)</li> <li>• Construction of offices and access control</li> <li>• Preparation of construction roads, borrow areas, parking areas, railroad spurs, etc.</li> <li>• Utilities such as potable water, electricity, sanitary sewage, systems, data cables, transmission lines, etc.</li> <li>• Erection of support buildings</li> </ul>	Nuclear Installation Site Licence (NISL) or a NIL to site.	Mandatory  Application for early site activities can be submitted by an applicant for construction and/or operation of the installation subject to the information required as per the regulations on site licenses being submitted and accepted by the NNR.  The design of the nuclear installation to be sited must be at a sufficient level of detail to allow for the relevant assessments to be made as required by the siting regulations.  A NIL to site, construct and/or operate as well as applications for a NISL are to comply with the publication and public participation processes as contemplated in Section 21.

1 (c)	<p>Early Construction Activities:</p> <ul style="list-style-type: none"> <li>• Dewatering</li> <li>• Diaphragm wall</li> <li>• Excavation and clearance to bedrock</li> </ul>	Nuclear Installation Licence (NIL) to site.	<p>Mandatory</p> <p>An application for authorisation for early construction activities may be submitted as part of a complete application for a NIL for construction and/or operation.</p> <p>The application must include a safety assessment, as applicable, a description of the activities requested to be performed, and the design and construction information otherwise required, but limited to those activities, and supporting information demonstrating compliance with functional and design requirements of the portions of the nuclear installation.</p> <p>A plan for redress of activities.</p>
2 (a)	Design	Authorisation to Design	Optional (section 7)
2 (b)	Manufacturing	Authorisation to Manufacture	<p>Optional (section 8)</p> <p>Mandatory for long lead item manufacturing.</p> <p>Conditions of authorisation will include mandatory hold and/or witness points.</p> <p>An application for construction of the nuclear installation has to be in place and being processed.</p>
3	<p>Construction</p> <ul style="list-style-type: none"> <li>• As per definition</li> <li>• Component manufacturing</li> <li>• Civil works</li> <li>• Installation of systems</li> <li>• Cold commissioning testing up to and including non-nuclear integrated tests</li> </ul>	<b>NIL</b> to construct a nuclear installation	<p>Mandatory (section 5.1)</p> <p>Conditions of authorisation will include mandatory hold and/or witness points</p>



	<ul style="list-style-type: none"> <li>Hot commissioning testing</li> </ul>		
4	Operation	<b>NIL</b> for the operation of the installation	Mandatory (section 5.2)
5	Decontamination and decommissioning	<b>NIL</b> for the decontamination and decommissioning of the installation	Mandatory (section 5.3)