



National  
**Nuclear  
Regulator**

## **AFCONE-IAEA Workshop on Nuclear Power**

**Promoting Effective Interaction Among Nuclear Industry and Regulatory Body in  
Countries Introducing Nuclear Power Programmes**

**30 to 31 May2022**

Dr. Bismark Tyobeka, Chief Executive Officer

Protecting people, property and the environment.



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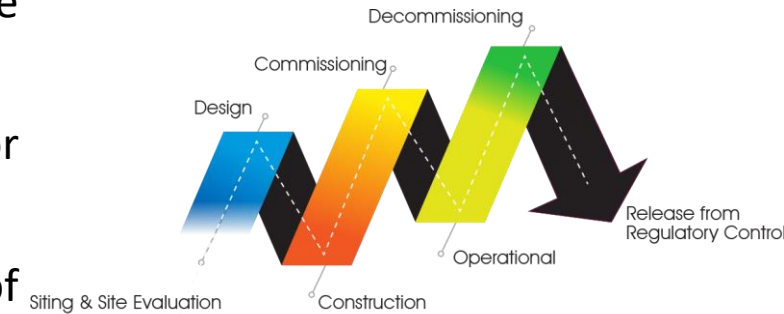
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3. Manufacturing Requirements
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# 1. Introduction

- The NNR is established in terms of the National Nuclear Regulator Act (Act No 47 of 1999) and its mandate and authority are conferred through sections 5 and 7 of this Act, setting out the NNR's objectives and functions, which include exercising regulatory control over **siting, design, manufacturing, construction etc of nuclear installations through the granting of nuclear authorisations.**
- Section 20(1) states that “No person may site, construct, operate ...a nuclear installation, except under the authority of a nuclear installation licence”.
- The NNR's responsibilities embrace all those actions aimed at providing the public with confidence and assurance that the risks arising from the production of nuclear energy remain within acceptable safety limits → Therefore:
- **Set fundamental safety standards, conducting pro-active safety assessments, determining licence conditions and obtaining assurance of compliance.**

# 1. Introduction (Licensing Process)

- This licensing process may result in the granting of one or more licences during the lifetime of a nuclear facilities, depending on national regulations and laws.
- The Regulatory Standards clarifies the licensing approaches that can be adopted for the licensing of nuclear facilities.
- The applicant may adopt a multi-stage approach to licensing or combinations of stages (1 step or multiple steps) of the nuclear authorisation.
- An applicant for a construction licence also has the option to apply for an Authorisation to manufacture. **This Authorisation would allow for manufacturing of long lead items such as the reactor pressure vessel in advance of a construction licence being issued.**
- Applicants also has the option to follow the following pre-licensing steps, in addition to a nuclear licence to site construct and operate, to apply for a:
  - i. Nuclear Installation Site Licence (NISL); and/or
  - ii. Authorisation to design a nuclear facility.
- Public consultation is part and parcel of the licensing process with recent experience with public hearings conducted as part of Thyspunt site NISL application.



## 2. Manufacturing Oversight

- The fundamental safety objective is “*to protect people and the environment from the harmful effects of ionizing radiation*” by:
  - preventing accidents in nuclear facilities with high confidence;
  - ensuring that, for all accidents taken into account in the design of the plant, radiological consequences, if any, would be minor; and
  - ensuring that the likelihood of a severe accident with serious radiological consequences is extremely low.
  
- Accident prevention is achieved through the use of reliable components and procedures in a nuclear facility operated by personnel that are committed to a strong safety culture. The primary means of achieving safety is the prevention of accidents and this is achieved through:
  - Conservative design
  - High quality in manufacturing, construction and operation of the plant
  - Quality assurance of the design intent
  - Fostering a positive safety culture of individuals involved in activities that have an impact on safety of the plant

## 2. Manufacturing Oversight

- The nuclear facilities should therefore be soundly and conservatively designed, constructed, maintained and operated in accordance with appropriate quality levels and engineering practices, such as the application of **redundancy, independence and diversity**.
- The various manufacturing oversight activities (Regulator, holders, AIA's and suppliers) have to ensure that the characteristics of the component being manufactured are consistent with the material and design specifications.
- Careful attention must be paid to the selection of appropriate **design codes and materials**, and to the control of manufacturing of components and plant construction.
- The claimed characteristics of the components in the design are the basis of the construction and operational safety case.

# 3. Manufacturing Standards

## 1. General Principles:

- Regulatory control & Approvals required
- Need for Integrated Management– safety culture and quality management
- Responsibility for Safety - Independent verification and Intelligent Customer Capability
- Graded Approach – classification of systems & components

## 2. Technical Principles

- Good engineering practice - Systems and components are conservatively designed, constructed and tested to standards commensurate with the safety and quality classification
- Quality Assurance - validation of designs, procurement, supply and use of material, manufacturing, and inspection and testing to ensure that specifications are met. Organisational arrangements for sound quality assurance practices are requisites for all parties concerned.
- Accident Prevention is the 1<sup>st</sup> priority - DiD Level 1, Conservative Design, High quality in manufacturing, construction and operation – entire life cycle

# 3. Manufacturing Standards (Requirements)

- RD-0034 defines the quality and safety management requirements that must be complied in a graded approach
- RD-0034 must be complied with by all organisations involved in the life cycle of the NPP (owner, designer, suppliers and sub suppliers) which could have an influence on the nuclear or radiation safety of the plant.
- Defines the Principles for Safety Culture implementation within the IMS framework
- Products are classified considering importance to nuclear safety and allocated to RD-0034 levels.

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**Requirements  
Document**

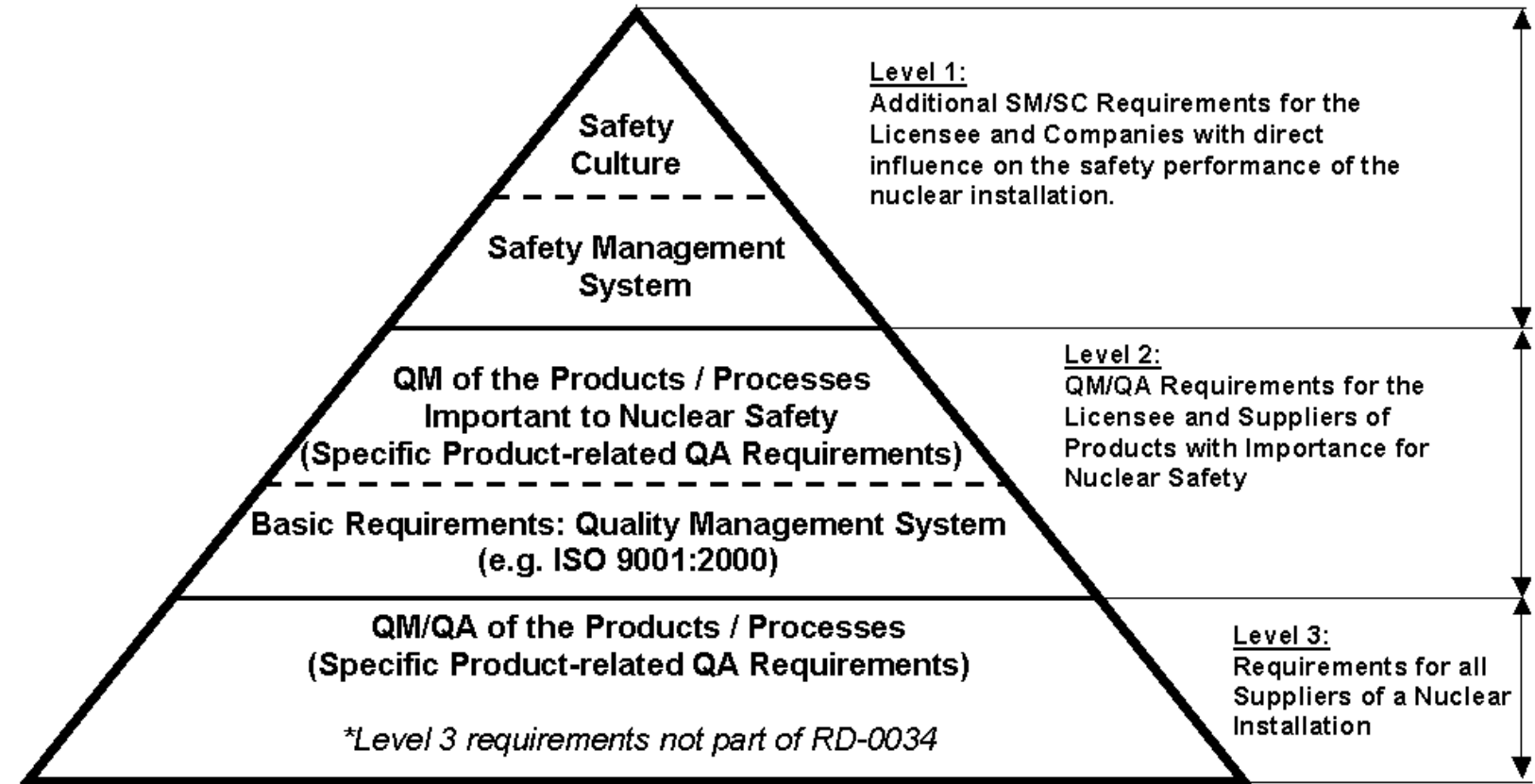
No.	Title	Rev.
RD-0034	Quality and Safety Management Requirements for Nuclear Installations	0

Approved:   
GA Clapison  
Acting Chief Executive Officer

Date of issue: 15/09/2008  
Revision Date:



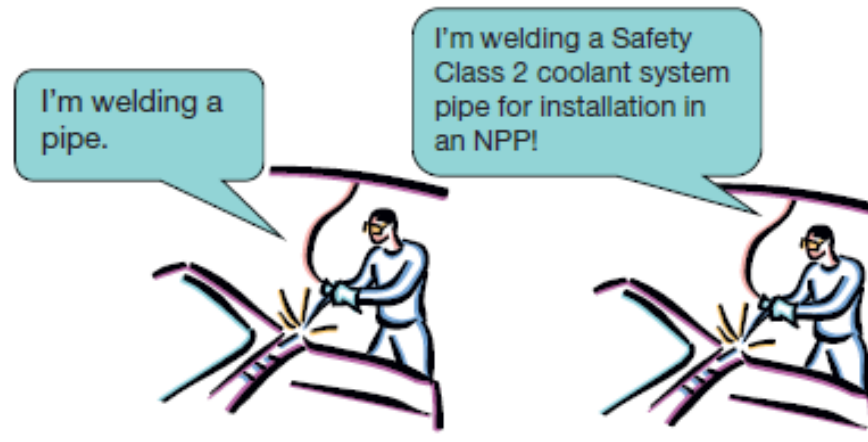
# 3. Manufacturing Standards (Requirements)



# 3. Manufacturing Standards (Safety Culture)

**NNR safety standards requires:**

- ✓ **Integrated Management System requiring both quality and safety management systems to be implemented in organisations involved in the lifecycle of the installation performing activities important to safety (RD-0034)**
- ✓ **This involves the implementation by policies and procedures and an Safety Culture Plan**



# 3. Manufacturing Standards (Supplier Qualification)

- **Applicant/Licensee** responsible for safety and must ensure that the RD-0034 requirements are implemented
- **Intelligent Customer**: The capability of the organisation to have a clear understanding and knowledge of the product or service being supplied
- RD-0034 (4): *In case important to nuclear safety activities are outsourced by the licensee or suppliers to other suppliers / sub-suppliers, the delegating organisation must implement oversight measures for these activities to retain intelligent customer capabilities*
- **NNR**: Qualification process of the applicant as operating organization and as owner

# 3. Manufacturing Standards (Supplier Qualification)

- Authorisation to Manufacture required. Typically included in the authorisation for construction.
- However, manufacturing of long lead items allowed subject to pre-condition for authorisation.
- Supplier qualification against RD-0034 requirements
- Component manufacturing
  - ✓ Quality Control Plan
  - ✓ Documents to be provided prior to manufacturing including safety evaluation, design specification. Design safety review.
- Regulatory oversight during supplier qualification and component manufacturing

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## Position Paper

No	Title	Rev.
PP-0012	MANUFACTURING OF COMPONENTS FOR NUCLEAR INSTALLATIONS	0

Approved: Mr. O Phillips

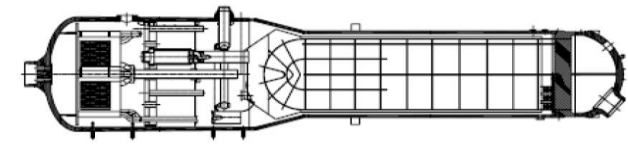
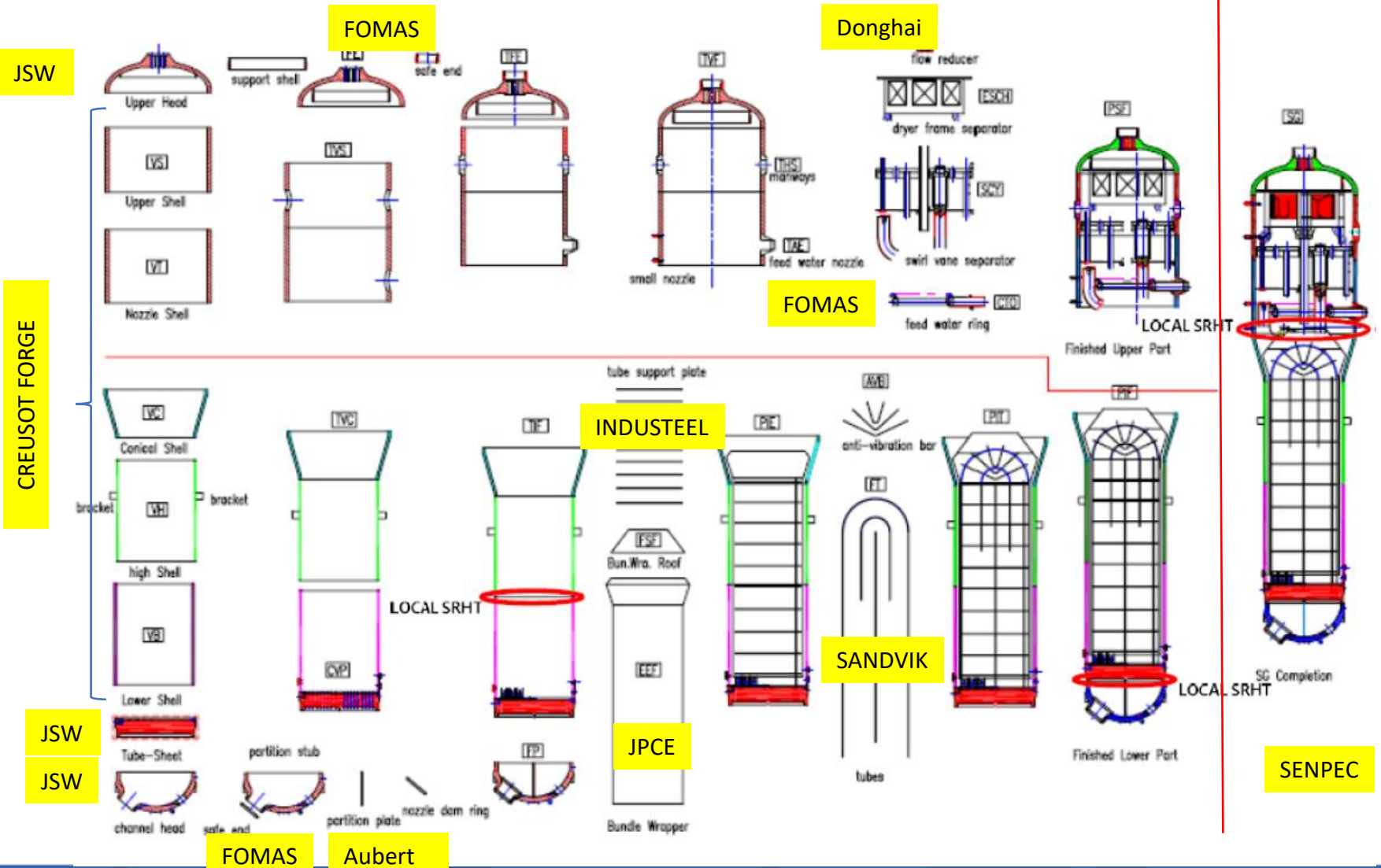
Date:

Senior Manager: Standards, Authorisation, Review and Assessment

Signature:

Unrestricted

# 3. Manufacturing Standards (Supplier Qualification – SGR Project)



# 4. Concluding Remarks

- The NNR is mandated to exercise Regulatory control related safety over the entire life cycle of the installation including design and manufacturing.
- The Quality and Reliability of SSCs is ensured through the use of appropriate standards, which includes material selection, and systems and processes, and by proper selection, training and qualification of workers
- Confident that Regulatory Standards defines a robust framework and a rigorous process that will ensure nuclear safety.
- In anticipation of new build, and lessons learned, regulatory standards have been revised in line with international developments
- Industry has an important role to play and must recognize their role in manufacturing.
- Safety culture and compliance to regulatory requirements is essential for providing assurance for the manufacturing phase.



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Thank you

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