



Nuclear Energy Safety Symposium

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**The Role Of Regulatory Authorities In
Future Nuclear Energy Safety
Development**

**Adv. Boyce Mkhize
CEO:NNR**

SCOPE OF PRESENTATION

- 1. Context for Nuclear Safety**
- 2. Role of the Regulatory Authorities**
- 3. Strong Nuclear Safety Culture**
- 4. Global Safety Regime**
- 5. Role of the Regulator**
- 6. Future Nuclear Safety Development**
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Context for Nuclear Energy

- **(1979)** Three Mile Island Nuclear Station accident as a result of fundamental problems involving hardware, procedures, training and attitudes towards safety complicated by regulatory concerns
- **(1986)** Chernobyl accident presented a stark reminder of hazards associated with nuclear technology
- **(2002)** Davis-Besse Nuclear Power Station reactor vessel head degradation



Context for Nuclear Energy

- (2011) Fukushima Daiichi Accident
- These accidents created understandable anxiety about nuclear technology
- Common thread, amongst other failures, in these accidents has been the role of the Regulatory Authorities
- Right to question the role of Regulatory Authorities in nuclear energy safety development



Context for Nuclear Energy

- But what of the other great achievements and advancements by nuclear energy and technology?
- A clean record of good and high standing in society is wiped out by a small lapse and the public tends to elevate the evil element over good
- **Implication** : we cannot be casual about matters of safety!



Role of Regulatory Authorities

Promote and Enforce Safety
Culture



Safety Culture Dichotomy

- Role of Operators versus the Regulator

Safety Culture

An organization's values and behaviours—modelled by its leaders and internalized by its members that serve to make nuclear safety an overriding priority



Role of Regulatory Authorities

Promotional

- Encourage and promote safety principles and practices (a voice of conscience)

Corrective

- Provide guidance and support

Adjudicative

- Intervene decisively in the interest of safety



Strong Nuclear Safety Culture

- Everyone is personally responsible for nuclear safety
- Leaders demonstrate commitment to safety
- Trust permeates the organization
- Decision-making reflects safety first
- Nuclear technology is recognized as special and unique



Strong Nuclear Safety Culture

- A questioning attitude is cultivated
- Organizational learning is embraced
- Nuclear safety undergoes constant examination (many safety concerns and incidents arise out of complacency)



Global Safety Regime

- Global Safety Regime – Defined by the IAEA as a “*Framework for achieving worldwide implementation of a high level of safety at nuclear installations*”
- The framework essentially comprises the activities undertaken by each country to ensure the safety and security of the nuclear installations within its jurisdiction augmented by the activities of a variety of international enterprises that facilitate nuclear safety



Global Safety Regime

- **Elements of the Global Safety Regime**
 - intergovernmental organizations,
 - multinational networks among operators,
 - multinational networks among regulators,
 - the international nuclear industry, multinational networks among scientists,
 - international standards setting organizations and
 - other stakeholders such as the public, news media and non-governmental organizations (NGOs) that are engaged in nuclear safety.



Global Safety Regime

- Nuclear Safety sits on the bedrock of International Conventions that are legally binding on the participating States. These are the:
 - Convention on Early Notification of a Nuclear Accident - 1986;
 - Convention on Assistance in the Case of Nuclear Accident of Radiological Emergency - 1987;
 - Convention on the Physical Protection of Nuclear Material -1987, scope extended 2005;
 - Convention on Nuclear Safety (CNS) -1994;
 - Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management 2001.



Global Safety Regime

- South Africa has ratified or acceded to all the abovementioned conventions
- Central and most important to the Global Safety regime is a strong national nuclear infrastructure, including an independent nuclear regulator.



Global Safety Regime

- It is recognised that some elements although functional today, especially after Fukushima, should be strengthened such as the:
 - Use of the review meetings of the Convention on Nuclear Safety as a vehicle for open and critical **peer review** and a source for learning from the best practices of others;
 - Enhanced utilization of the IAEA Safety Standards for the harmonization of national safety regulations to the degree possible;



Global Safety Regime

- Enhanced exchange of operating experience and the use of this experience for life cycle management and back fitting of nuclear facilities, as well as for improving operating and regulatory practices;
- Multinational cooperation for the safety review of new nuclear power plant designs.



Global Safety Regime

- An IAEA Ministerial Conference on Nuclear Safety in response to the Fukushima event concluded in June 2011 amongst others that:
 - The IAEA review and strengthen as appropriate its Safety Standards related to design requirements with particular emphasis on defence in depth, low probability beyond design basis events, single or in combination, and severe accident management and measures single, and more especially for multi-unit sites.



Global Safety Regime

- Conventions such as the Convention on Nuclear Safety be reviewed considering the lessons learnt from Fukushima taking into account areas such as transparency, the independence of regulators, emergency preparedness and peer reviews.
- The international, regional and national Emergency and Response frameworks be strengthened



Role of the Regulator

- Section 5 of the NNRA provides that the objects of the Regulator are amongst others to:
 - Provide for the protection of persons, property and the environment against nuclear damage through the establishment of safety standards and regulatory practices;
 - 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 issuance of nuclear authorisations;



Role of the Regulator

- Provide assurance of compliance with the conditions of nuclear authorisations through the implementation of a system of compliance inspections;
- Fulfill national obligations in respect of international legal instruments concerning nuclear safety and
- Ensure that provisions for nuclear emergency planning are in place.



Future Nuclear Energy Safety Development

- NNR Standards requires that the safety demonstration includes both deterministic and probabilistic safety assessments which have been applied with the licensing of the Koeberg units.
- **Standardisation** of designs and **harmonisation** of standards will significantly contribute to increased safety globally.
- Learning from Fukushima accident and factoring the lessons in design, beyond design basis, external events and emergency preparedness



The Future

- NNR review of its standards factoring lessons from Fukushima
- Principles of continuous improvement and operating experience feedback as part of nuclear safety.
- NNR participation in international forums such as the Multinational Design Evaluation Programme (MDEP) and IAEA safety committees
- Strengthening Regulatory framework – Siting to Decommissioning



Conclusion

- Make sure we embrace nuclear safety principles and cultivate a continuous learning environment



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- Institute of Nuclear Power Operations (INPO) – Principles for a Strong Nuclear Safety Culture (November 2004)



Thank You

