




NATIONAL NUCLEAR REGULATOR
For the protection of persons, property and the environment against nuclear damage.

Leveraging Regional Partnerships for Improved Nuclear Safety and Security Practices


Dr Bismark TYOBEKA
South Africa






SOUTH AFRICAN REGULATORY FRAMEWORK


- Dates back to 1948 (Atomic Energy Act)
- Nuclear Installations Act 1963 – licensing of Nuclear Installations by AEB
- Nuclear Energy Amendment Act (Act 56 of 1988) - establishment of autonomous Council for Nuclear Safety
- At present the nuclear sector in South Africa is mainly governed by
 - the Nuclear Energy Act, Act 46 of 1999 (NEA) and
 - the National Nuclear Regulator Act, Act 47 of 1999 (NNRA),
- Additionally the Hazardous Substances Act, Act 15 of 1973 (HSA), provides for control of
 - Group III hazardous substances and
 - Group IV hazardous substances





REGULATORY FRAMEWORK


- The governance and regulation of radioactive waste management is also subject to the provisions of the following other acts:
 - National Radioactive Waste Disposal Institute Act, Act No. 53 of 2008. (NRWDIA)
 - Environment Conservation Amendment Act, Act 50 of 2003. (ECAA)
 - Minerals and Petroleum Resources Development Act, Act No. 28 of 2002. (MPRDA)
 - National Environmental Management Act, Act No. 107 of 1998. (NEMA)
 - National Water Act, Act No. 36 of 1998. (NWA)
 - Water Services Act, Act No. 108 of 1997. (WSA)
 - Mine Health and Safety Act, Act No. 29 of 1996. (MHSA)
 - Environment Conservation Act, Act 73 of 1989. (ECA)
 - Dumping at Sea Control Act, Act No. 73 of 1980. (DSCA)




 **National Nuclear Regulator**

- The National Nuclear Regulator Act (Act No 47 of 1999) (NNRA) established the National Nuclear Regulator (NNR). It repealed the Nuclear Energy Act (NEA) (Act No 131 of 1993) which was applicable to the erstwhile Council for Nuclear Safety (CNS).
- The NNRA came into force on 24 February 2000.
- The previous NEA legislated activities of both the Atomic Energy Corporation of South Africa and the CNS. The promulgation of the NNRA, which deals exclusively with the regulation of the nuclear industry, provides for the separation of the promotional and Regulatory functions in the nuclear industry in South Africa.
- The promotional aspects of nuclear activities in South Africa are legislated by the Nuclear Energy Act (Act No 46 of 1999)
- Safeguards functions also legislated by Nuclear Energy Act (Act 46 of 1999)



 **OBJECTS OF NNR**
Section 5 of ACT 47 of 1999

- Provide for the protection to persons property and the environment against nuclear damage through the establishment of safety standards and regulatory practices
- Exercise regulatory control over nuclear installations, vessels propelled by nuclear power or having radioactive material on board and actions to which the Act applies through the granting of nuclear authorisations.
- Provide assurance of compliance of conditions of nuclear authorisations through compliance inspections.
- Fulfil national obligations in respect of international instruments.
- Ensure that provisions for an emergency plan are in place.



 **REGULATED NUCLEAR FACILITIES**





National Measures to Improve Nuclear Safety

- Noting that the primary legislation governing regulation of the nuclear sector was last updated in 1999, South Africa has embarked on a review and update of both the Nuclear Energy Act, 1999 (Act No. 46 of 1999) and the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999).
- stemming from the conclusions of the National Regulatory Self-Assessment undertaken (2010), a need to update the NNR Regulations on Safety Standards and Regulatory Practices was identified.
- The updated suite of regulations comprises –
 - the General Nuclear Safety Regulations, integrating all thematic areas in a coherent and harmonised set of requirements,
 - complemented by a series of facilities and/or Action-Specific Safety Regulations.





National Measures to Improve Nuclear Safety

- The General Nuclear Safety Regulations include the following parts:
 - Scope of regulatory control
 - Management of safety
 - Nuclear authorisation;
 - Safety assessment
 - Radiation protection and waste safety
 - Transport
 - Emergency planning
- The specific nuclear safety regulations include regulations on the following:
 - Nuclear security and physical protection systems
 - Nuclear installations
 - Waste disposal facilities.
- Additionally the NNR has developed regulations on:
 - Financial liability in case of nuclear damage
 - Enforcement
 - Public safety information forum
 - Public participation





National Measures to Improve Nuclear Safety

- 2013 INIR Mission
- EPREV Mission in 2014
- Regulatory Forums
 - NERS
 - FNRBA
 - NRN
 - Bilateral Agreements with International Regulators
 - Argentina, Canada, Finland, France, South Korea, Russia, the United Kingdom and the United States of America






CHALLENGES FACED IN THE AFRICAN REGION

- The application of radiation and nuclear technology is widespread within the African region in the health, agriculture and industrial sectors and also expanding to uranium mining and milling and with some states having declared their aspirations to expand or start nuclear power programmes.
- Today, there are ten operating RRs across the African continent. These reactors cover a wide power range, starting with 30 kW up to 22 MW.
- The Koeberg nuclear power station in South Africa is the only nuclear power plant on the continent.






CHALLENGES FACED IN THE AFRICAN REGION

Table 1. TYPES OF RESEARCH REACTORS IN AFRICA

Country	Facility Name	Type	Thermal Power (kW)	Neutron Flux (s ⁻¹ cm ⁻²)
Algeria	Nur	Pool	1000	5.0×10 ¹³
Algeria	E-Salam	Heavy water	15 000	2.1×10 ¹⁴
*Democratic Rep. of the Congo	*TRICO II	TRIGA Mark II	1000	3.0×10 ¹³
Egypt	ETR-1	Tank WWR	2000	3.6×10 ¹³
Egypt	ETR-2	Pool	22 000	2.8×10 ¹⁴
Ghana	GHARR-1	MNSR	30	1.2×10 ¹²
Libya	IRT-1	Pool, IRT	10 000	2.0×10 ¹⁴
Morocco	MA-R1	TRIGA Mark II	2000	4.4×10 ¹³
Nigeria	NIRR-1	MNSR	30	1.2×10 ¹²
South Africa	SAFARI-1	Tank in pool	20 000	2.8×10 ¹⁴

* At present on extended shutdown status.





CHALLENGES FACED IN THE AFRICAN REGION

- The regulatory infrastructure and the technical capabilities for the control and monitoring of radiation sources, nuclear and radioactive material and nuclear installations in the region is at various levels of implementation and varying consistency in the application of international standards.
- Some countries do not have regulatory infrastructures or regulatory bodies while others have multiple regulatory bodies thereby making coordination problematic.
- For most of the countries, the regulatory infrastructure is at its infancy thus significant improvement in the technical capabilities is required.





REGIONAL LEVEL COOPERATION – FNRBA

- The FNRBA is a regional organization comprising of nuclear regulatory bodies in Africa with its core business to provide a platform and mechanism for exchanging experiences and sharing knowledge as well as contributing to and promoting the development and harmonization of nuclear regulatory infrastructures in Africa.
- Membership is voluntary and is open to all nuclear and radiation regulatory bodies in the region
- The establishment of FNRBA is considered as a key milestone catalysing the enhancement, strengthening and harmonization of radiation and nuclear safety and security regulatory infrastructure in member states.
- This Body has been operational since 2009 and cooperation amongst its members include regulatory matters in areas of radiation therapy; uranium mining; nuclear power programmes; transport of radiation sources; waste management and emergency response initiatives.






FNRBA MEMBERSHIP

- Currently 31 Members

FNRBA Member States


* Benin and Chad are not yet registered as FNRBA members





FNRBA STRUCTURES

- Plenary:
 - The Plenary is the supreme decision making body of the FNRBA;
 - The Plenary consists of the entire membership of the FNRBA;
 - It is held annually alternating in the five (5) regions of Africa;
- Steering Committee:
 - 9 members
 - Chair, Deputy Chair, Secretary, Deputy Secretary, representative from each of the 5 regions
- Thematic Working Groups:





FNRBA THEMATIC WORKING GROUPS

TWIG	TITLE	COORDINATOR	DEPUTY COORDINATOR
TWG1	UPGRADING OF LEGISLATIVE AND REGULATORY INFRASTRUCTURE	ETHIOPIA	MOROCCO
TWG2	UPGRADING OF SAFETY IN RADIOTHERAPY	TUNISIA	SUDAN
TWG3	UPGRADING OF SAFETY IN URANIUM MINING AND MILLING	NAMIBIA	SOUTH AFRICA
TWG4	FRAMEWORK FOR LICENSING OF NUCLEAR POWER PLANTS	SOUTH AFRICA	NIGERIA
TWG5	UPGRADING OF SAFETY IN NUCLEAR RESEARCH REACTORS	GHANA	LIBYA
TWG6	EDUCATION, TRAINING AND KNOWLEDGE MANAGEMENT	NIGERIA	MALI
TWG7	UPGRADING OF RADIOACTIVE WASTE SAFETY INFRASTRUCTURE	TANZANIA	MALAWI
TWG8	UPGRADING SAFETY IN TRANSPORT OF RADIATION SOURCES	ZIMBABWE	MADAGASCAR
TWG9	REGULATORY INFRASTRUCTURE FOR EMERGENCY PREPAREDNESS AND RESPONSE	SOUTH AFRICA	KENYA
TWG10	UPGRADING NUCLEAR SECURITY INFRASTRUCTURE	EGYPT	





SUB-REGIONAL COOPERATION - NRN

- The Southern Africa Development Community Nuclear Regulators Network (SADC NRN).
- recognition of the common challenges facing nuclear regulatory authorities in their endeavours to protect people and the environment from the harmful effects of ionising and non-ionising radiation.
- The inaugural meeting of the SADC NRN was held in Cape Town, South Africa in Nov 2010 where the framework for cooperation was laid.
- The Memorandum for Cooperative Arrangements (MCA) was drafted and finalised in Harare, Zimbabwe in February 2011.
- The MCA was signed in Vienna, Austria in October 2011 on the side-lines of the 56th Regular Session of the International Atomic Energy Agency General Conference.
- To enhance and further the goals of the MCA, the SADC-NRN members have developed a draft protocol.






Objects


- Strengthen and harmonise the regulation of nuclear safety, nuclear security, radiation protection, radioactive waste management, and safe transport of radioactive material within the SADC region;
- Promote the establishment of harmonised safety standards to protect the health of workers, members of the general public and the environment from the potential harmful effects of radiation and ensure that said standards are applied;
- Foster the close cooperation, sharing of information and exchange of experiences related to the regulation of nuclear and radioactive material, including naturally occurring radioactive material (NORM), within the SADC region;






Objects


- Foster the development of technical expertise and the provision of mutual assistance;
- By means of appropriate supervision, provide assurance that nuclear and radioactive materials within the SADC region are not diverted to purposes other than those for which they are intended;
- Foster the sharing of information related to nuclear and radiological events in the SADC region and the implications or effects thereof within the state in which the event occurs as well as within the SADC region.





Scope

- The scope of this Protocol relates to activities involving nuclear and radiological material including:
 - nuclear power reactors
 - nuclear research reactors
 - nuclear fuel cycle facilities
 - the manufacture, use, storage, disposal, transport, import and export of radioactive sources
 - radioactive waste management
 - transport and storage of radioactive material, including nuclear fuel
 - mining and mineral processing of radioactive ores
 - application of nuclear and radiological techniques in medicine
 - radiation generated from machines or devices
 - other activities involving exposure to natural radiation





A Note on Regulatory Independence and Effectiveness

- As we expand our use of nuclear technology and nuclear power in the continent it is recognised that this can only truly be achieved under a robust and independent regulatory regime.
- Enhancement and strengthening of the current regulatory infrastructure in the SADC region and the African continent as a whole.
- In developing/enhancing the regulatory infrastructure there must be a clear recognition that there is an inherent risk in using nuclear technology. The public must therefore be protected and informed accordingly
- In establishing security requirements, those considering nuclear technology must also consider the fact that nuclear material must not fall into the wrong hands.
- To be truly independent, the regulatory body must be separate from the political and economic pressures associated with promoting nuclear power. A nuclear regulator must be independent, but simply being separated from promotional activities on an organization chart isn't enough.





Independence cont'd

- The regulator must be adequately funded and staffed with highly-competent subject matter experts. It must have the authority to stop an activity if it identifies a safety concern, even if it means that a project is delayed.
- It must be able to shut down a plant that's not operating safely, even if it means a population is temporarily deprived of electricity or the supply of radioisotopes for medical application is suspended.
- To have this authority, a regulator must have the ability to make truly independent safety decisions, with the confidence that those decisions won't be overturned for political reasons.
- Another important aspect that is key to regulatory effectiveness and indeed regulatory credibility is openness and transparency in regulatory decision making with appropriate opportunities for public and interested party inputs.





Concluding Remarks

- AS the leading nuclear regulator on the continent, the NNR is committed to enhancing nuclear regulation in the region.
- WE are active in both the SADC-NRN (on a sub regional level), and FNRBA on a regional level.
- Our work within the IAEA safety committees, participation in activities of ICRP, IRPA, NERS network and within the bilateral agreements demonstrates our commitment to engage and enhance safety under the global regime





THANK YOU

Dr M B Tyobeka
Chief Executive Officer

National Nuclear Regulator
Phone: +27 (12) 674 7100
E-mail: BMTyobeka@nnr.co.za

Eco Glade Office Park | Eco Glades Office 2 Block G1 420 Witich Hazel Avenue | Centurion
P. O. Box 7106 | Centurion | 0046