PARLIAMENTARY SELECT COMMITTEE ON ECONOMIC DEVELOPMENT

PRESENTATION ON LICENSING OF NEW NUCLEAR POWER REACTORS AND NEW NUCLEAR SITES IN SOUTH AFRICA

Date: 01 June 2010

SCOPE OF PRESENTATION

1. Profile of the National Nuclear Regulator
2. Regulatory Framework, Standards and requirements
3. Technology Considerations / Requirements
4. Regulatory Infrastructure
5. Timelines
6. Issues / Gaps

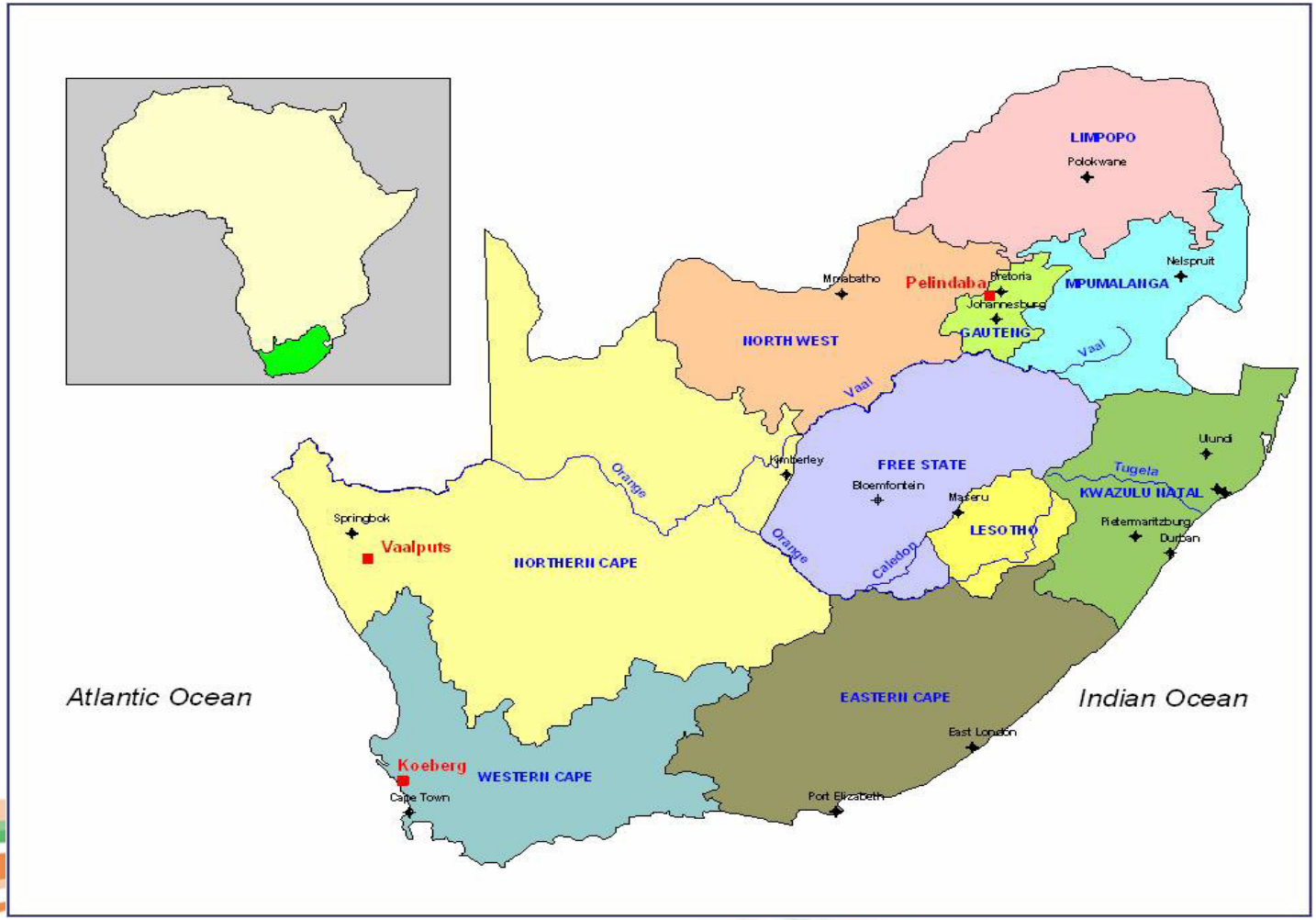
PROFILE OF THE NNR (1/3)

- Established by the National Nuclear Regulator Act (Act No 47 of 1999)
- The NNR Act deals exclusively with the regulation of the nuclear industry,
- The basic mandate of the NNR is "***to provide for the protection of persons, property and the environment against potential nuclear damage***"
- The provision of this protection is accomplished partly through
  - **Establishing safety standards,**
  - **Issuing nuclear licenses and Certificates of authorizations**
  - **Conducting compliance assurance inspections**
  - **Taking necessary enforcement where necessary**

PROFILE OF THE NNR (2/3)

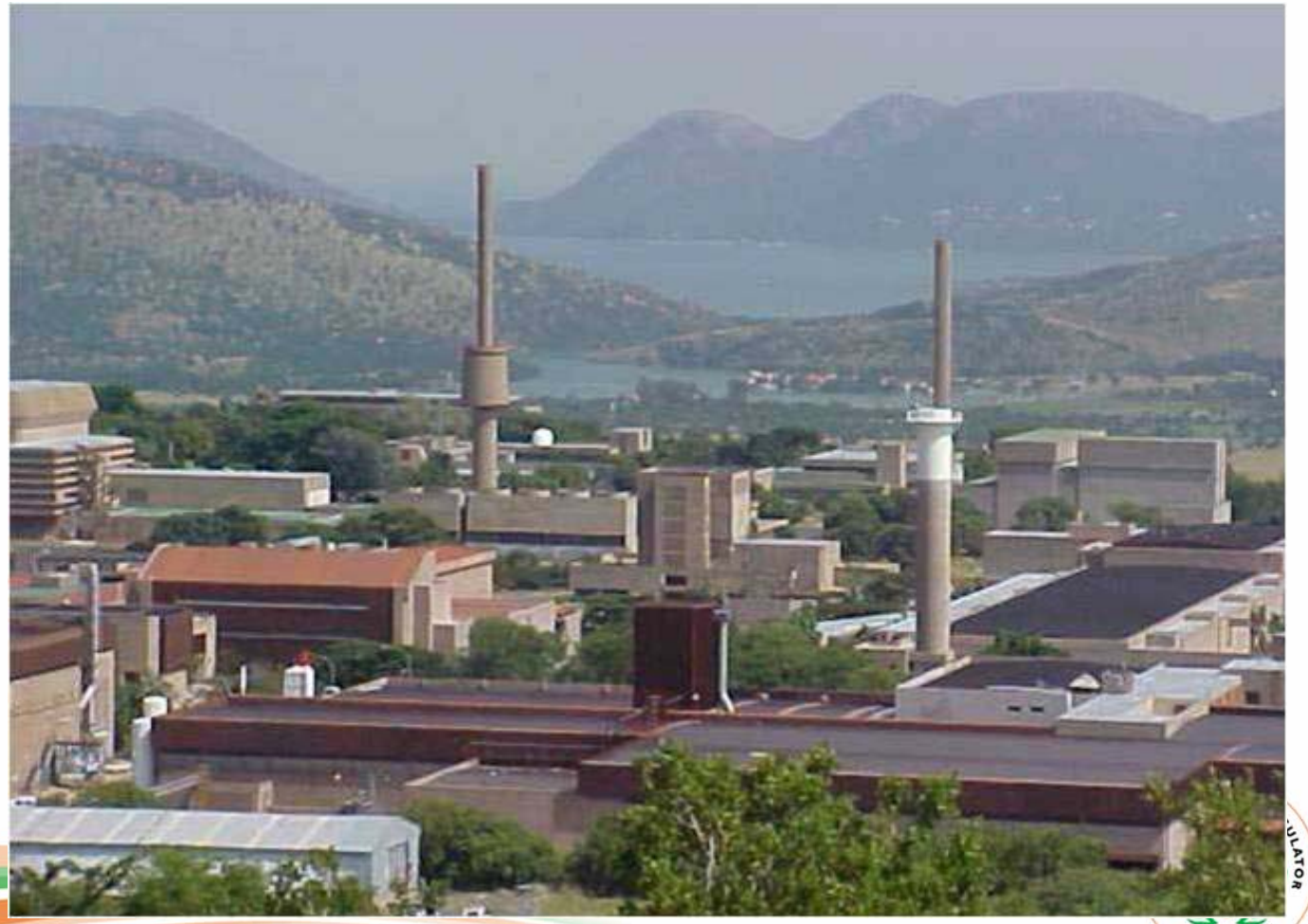
- The NNNR currently regulates the entire nuclear fuel cycle
  - **Uranium mine exploration**
  - **Uranium mining and milling**
  - **Enrichment**
  - **Fuel fabrication**
  - **Operation Nuclear Power Plant**
  - **Waste Management and**
  - **Decommissioning**
- The facilities and actions that are regulated by NNR currently include the following
  - **Nuclear Power Plants (Koeberg Nuclear Power Pant and PBMR)**
  - **Research Reactors (Pelindaba)**
  - **Waste Management Repository (Vaalputs)**
  - **Mines & Scrap metals dealers**
  - **Nuclear Vessels**

GEOGRAPHICAL LOCATION OF SELECTED NUCLEAR FACILITIES



KOEBERG NUCLEAR POWER STATION

NECSA PELINDABA SITE FACILITIES



VAALPUTS NATIONAL RADIOACTIVE WASTE DISPOSAL FACILITY

NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORM) FACILITIES

New Nuclear Sites Licensing

1. Introduction
(Typical Licensing Stages)

Siting of New Nuclear Installation

Design review

Construction (also covers Manufacturing, Procurement)

Commissioning

Operation

Decommissioning

(Combined licence for siting, design, construction, commissioning, operation, is allowed)

2. Regulatory Framework

- National Nuclear Regulator (NNR) established by NNR Act
- Regulations, eg. Safety Standards and Regulatory Practices R388
- Authorisations (licences), Requirements Documents (RDs), Guidelines and procedures
- Radioactive Waste Management Policy and Strategy

2. Regulatory Framework (NNR Standards and Processes)

The NNR has well established and internationally recognized safety standards and regulatory practices for the purposes of fulfilling its present mandate.

In terms of nuclear licensing requirements to be applied to potential future new nuclear power plants (and other nuclear fuel cycle facilities), the approach of the NNR is that all current safety standards and regulatory practices and associated relevant NNR Requirements and Guidelines will as a minimum be applicable to new builds.

In terms of internal processes the NNR has review processes and inspection programmes developed for the regulatory oversight of Koeberg Nuclear Power Station and the PBMR programmes. These will be adapted to take account of the siting, construction, commissioning and operational phases of the new build programme.

2. Regulatory Framework (NNR Requirements, Guidelines and Position Papers - Applicable Examples)

Document reference	Description	Status
NNR Act No 47 of 1999	National Nuclear Regulator Act	Published
Regulation No R 388	Regulations in terms of section 36 …..on Safety Standards and Regulatory Practices	Published
RD-0024	Requirements on Licensees of Nuclear Installations Regarding Risk assessment and Compliance with the Safety Criteria of the NNR	Approved
RD-0022	“Dose limitation for Koeberg Nuclear Power Station”	Approved
RD-0018	Basic Licensing requirements for Pebble Bed Modular Reactor	Approved
RD-0034	Quality and Safety Management Requirements for Nuclear Installations	Approved
RD-0016	Requirements for licensing submissions involving computer software and evaluation models for safety calculations Rev 0	Approved

2. Regulatory Framework (NNR Requirements, Guidelines and Position Papers - Applicable Examples)

Document reference	Description	Status
RD 0014	Emergency preparedness and Response Requirements for Nuclear Installations Rev 0	Approved
RD-0015	“NNR requirements on the control and monitoring of developments in the formal emergency planning zone of Koeberg Nuclear Power Station”	Approved
LD-1077	“Requirements for Medical and Psychological Surveillance and Control”	Approved
LD-1081	“Requirements for Operator Licence Holders at the Koeberg Nuclear Power Station” .	Approved
LD-1092	“Requirements for Initial Operator Licensing at Koeberg Nuclear Power Station”	Approved
LD-1093	“Requirements for the Full Scope Operator Training Simulator at Koeberg Nuclear Power Station”	Approved
RD-0026	“Decommissioning of Nuclear Facilities”	Approved

2. Regulatory Framework (NNR Requirements, Guidelines and Position Papers - Applicable Examples)

Document reference	Description	Status
RD-0013	Requirements on public information document (PID) to be produced by applicants for new authorizations.	Approved
LG-1045	Guidance for licensing submissions involving computer software and evaluation models for safety calculations Rev 0	Approved
LG-1041	Licensing guide on safety assessments for nuclear power plants	Approved
PP-0008	“Design Authorisation Framework”	Approved
PP-0009	“Authorisations for Nuclear Installations”	Draft
RG-0005	Guidance on the Testing, Qualification and Commissioning of the PBMR DPP	Approved

2. Regulatory Framework (Regulations)

- The NNR has drafted regulations on the siting of new nuclear installations. These were published for comments in July 2009.

- The NNR has drafted a new regulation on control and monitoring of developments in the formal emergency planning zone of Koeberg Nuclear Power Station. This is presently being workshopped with the local authorities. A similar regulation will be required for any new site, which will be consistent with the requirements of the regulation on siting referred to above.

2. Regulatory Framework (Regulatory Framework Optimisation Project)

The NNR is presently revisiting its current regulatory requirements, guidelines and processes and updating them accordingly taking cognizance of:

- Current international regulatory practices and safety objectives as related to these actions
- Past experience with licensing of nuclear facilities
- Changes in the national and international environments linked to a potential expansion in nuclear activities .

The fundamental objectives of this development is to address the following:

- Harmonization of the regulatory processes within the NNR and in SA
- Greater transparency, consistency and stability
- Documentation providing clear expectations on the core business of the NNR linked to the external drivers, namely national legislation and national and international conventions.
- Corporate memory retention, capacity building

2. Regulatory Framework (Regulatory Optimisation Framework Project)

Scope

1. Existing National /International Framework
2. NNR Experience feedback
3. Ongoing international regulatory initiatives (eg WENRA)
4. NNR Standards - General Principles of Nuclear Safety
5. NNR Regulatory Principles
6. NNR Safety Goals and Indicators
7. NNR Compliance assurance programmes

8 - 25. NNR Standards on specific disciplines

Completion by September 2010

Follow up on recommendations over longer period (2010-2013)

3. Technology Considerations / Requirements (1/2)

- In revisiting its regulatory requirements, the NNR considers that, as a global safety goal for evolutionary designs of nuclear installations such as new nuclear power plants, a significant improvement of the safety of the next generation of nuclear power plants at the design stage is necessary compared to existing plants, especially but not limited to better consideration of the problems related to prevention and mitigation of severe accidents.

- New nuclear power plants designs, incorporate significant improvements on nuclear safety, such as additional redundancy, passive safety features, severe accident countermeasures. These advances significantly enhance the principle of defence-in-depth in terms of multiple barriers, redundancy, accident prevention and mitigation.

3. Technology Considerations / Requirements 2/2

- One major outcome of these new designs is that the emergency planning zones, specifically the Urgent Planning Zone, which is the zone within which evacuation of the public has to be catered for, would in all likelihood be reduced from 16 km in the case of Koeberg, to a much smaller radius which could fall within the property owned by the holder, and thereby to some extent minimize the issue of the control on urban developments which could potentially threaten the viability of nuclear sites.
  - This could potentially have a positive socio-economic impact on developments around these nuclear sites .

4. Regulatory Infrastructure

- Regulatory oversight of Koeberg: 11 posts (inspectors)+ internal technical support from the NNR Assessment Group of +/- 10 Specialists.
- For new builds it is estimated that the NNR will need 18-20 additional staff for overall licensing activities, reviews of submissions, in-depth assessment of the safety case, etc..
- This will be complemented by using external technical support (as presented in the next slide) to optimise NNR resources.
- Resource Requirements: Funding for staffing, facilities, etc.

4. Regulatory Infrastructure (Technical Support)

- NNR participation in international initiatives such as the Multinational Design Evaluation Program (MDEP) and other
- Optimisation of resources can be done through securing licensing / technical support, training from country of origin (e.g. regulator)
- Technical support from local/international Technical Support Organisations (TSOs) estimated to be equivalent to +/- 20 persons effort/year which include the safety case review, computer codes development, etc..throughout the overall licensing process.
- NNR staff, particularly younger staff should interact frequently with industry experts, locally and abroad for capacity building, skills transfer.

5. Timelines

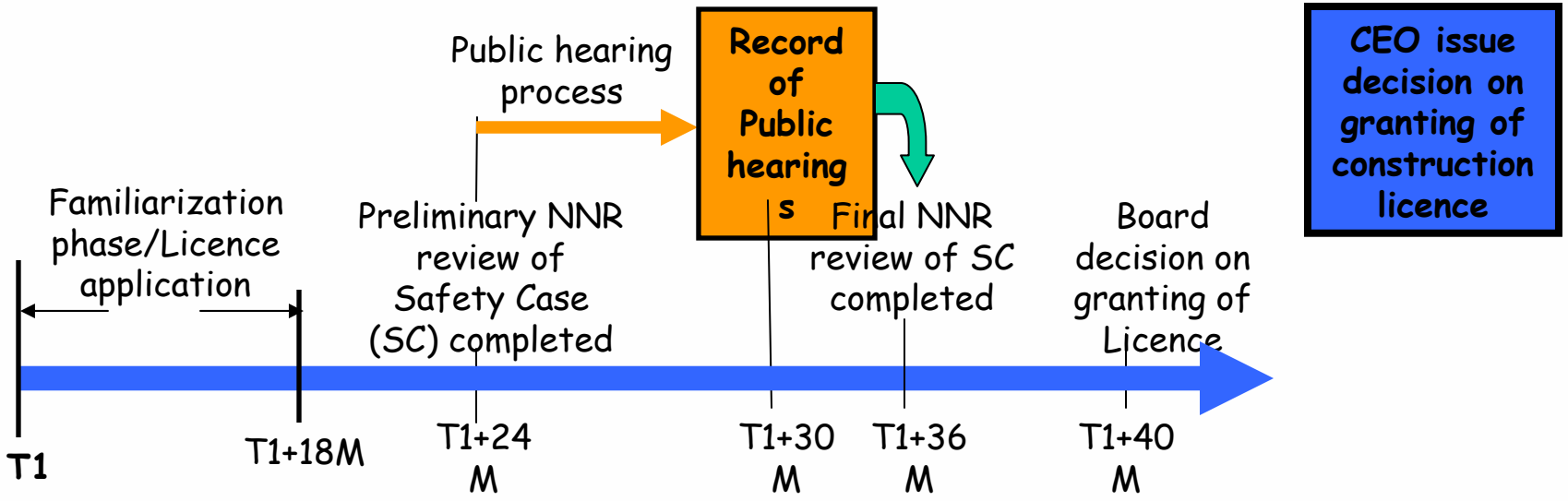
- NNR timelines dictated by the following:
  - NNR recruitment campaign
  - Establishment of external resources
  - Familiarisation with new technology
  - Authorisation requirements
  - Public Participation
  - Review of Safety Case
  - Board Process

Consideration of this matter needs to be given by the decision makers.

- The estimated timescales for licensing of new reactor technology given in the NNR Strategy are subject to the design being internationally accepted/proven, and are therefore very dependent on selected technology, as well as availability of the necessary documentation.

LICENSING OF NEW "PROVEN"REACTOR TECHNOLOGY
NNR ESTIMATE TIMESCALES

Review of licence application (combined siting, design review, construction licence)



6. Major Issues / Gaps

1. Regulation on the siting of new nuclear installations – In progress (published in July 2009)

2. Protection of long term viability of nuclear sites is not covered under the present NNR Act. The proposed regulations on control of developments around nuclear installations (Section 38(4) of the NNR Act) applies when there is an installation on the site e.g in terms of viability of emergency plans .
   - Mechanisms should be investigated to “protect” identified sites prior to the construction of a nuclear installations e.g new/changes to legislation, arrangements with the local/provincial authorities etc..
   - Might not be a major issue depending on the technology selected (refer previous slide)

3. NNR Act allows representations to be made objecting to decision of the NNR. This could potentially delay construction by several years.

6. Major Issues / Gaps (cont.)

4. There should be better integration of the EIA and licensing processes. In the meantime the NNR has a cooperative agreement with DEAT for addressing radiological issues identified in the EIA process and common to NNR licensing review
5. Timing of application to accommodate NNR timescales, including time for NNR recruitment , establishment of external resources and familiarisation with new technology .
   - Serious consideration of this matter needs to be given by the decision makers.
6. Formation of a Technical Committee Advisory Group for NNR Board – discussions with Board in progress.

7. On-going support by the vendor country to the holder and the NNR for the lifetime of the plant. This should be included in the negotiations.

- Thank you -

Thank You

DISCUSSIONS