The NNR's Insights into the Licensing of New Power Plants

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Overview

1. Background – Regulatory Approach
2. Technology
3. Skills
4. Funding

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1. Background - Regulatory Approach

First License was for a **Turnkey Project**

Koeberg Power Station – 2 X 900 MWe PWR

Approach:-
- based on country of origin (ref station – Tricastin in France)
- use design codes and criteria recognized internationally (based on US 10 Code of Fed Regulation 50)
- subject to quantitative safety assessment by PRA

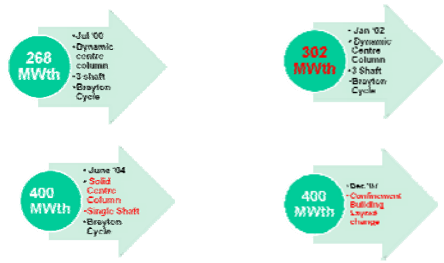
2000 - Application for NIL

'First of Kind' – both the applicant and the regulator on learning curve

- **S**afety **C**ase **P**hilosophy – identification if **K**ey **L**icensing **I**ssues
- **S**afety **A**nalysis **R**eport – demonstration of safety objectives
- **G**eneral **O**perating **R**ules – practices applicable during operating phase

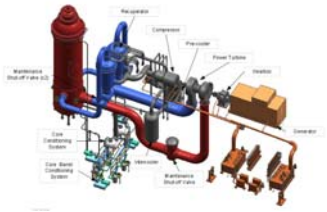
2. Technology
(1/4)

Evolution of the PBMR technology in South Africa



2. Technology
(2/4)

- 400 MWth, helium cooled, graphite moderated PBMR
- Annular Core
- Direct Brayton Cycle
- Single, horisontal shaft



2. Technology
(3/4)

Technical Issues
•Fuel integrity and qualification (source term)
•Chemical attack (Graphite oxidation and corrosion through water and/or air ingress; prevention and mitigation)
•Circuit contamination (Graphite dust generation, statistical coated particle failure, activation products, fission product diffusion)
•Heat removal (bypass flows and passive systems)
•Containment design (probability and consequences of pipe breaks)
•External events
•High temperature materials and qualification

Licensing Issues (examples)
•Application of Codes and Standards
•Safety Classification

2. Technology
(4/4)

Lessons Learned

•Maturity of design organisation and processes
•Maturity of design especially the safety concept considering design principles such as DiD, redundancy, diversity, single failure, etc.
•Safety culture
•Long Lead item manufacturing
•Supplier management and oversight (Regulator, Applicant, Designer, Suppliers)

Interventions
•Design Assessment Framework - Systematic phased design assessment process and ensures that a minimum set of information is available before proceeding to the next phase of the design assessment (PP-008)
•Quality and Safety Management Requirements updated considering the principles of safety culture, responsibility for safety, intelligent customer capability, etc. (RD-0034)

3. Skills

- Experience in Light Water Pressurized Reactors
- Need to develop in-house expertise in gas/graphite reactor technology
- No local TSOs
- International TSO utilized – conflict with government strategy for localization
- Bilateral Agreements not fully exploited
- Technical Co-operation opportunities not fully utilized

4. Funding

- Role of Regulator not fully appreciated by Policy/Decision Makers
- Future of PBMR – change in business strategy

Thank You