Bridging the Nuclear Gap

Nuclear Localisation Conference 1-3 June 2011

Presented by: Des Muller – Group Five Power Developments
Sometimes in the winds of change we find our true direction.
Bridging the Nuclear Construction Gap
Our Construction Heritage

1950’s: 8 Power Stations – 65 Units – 3000MW

1960’s: Five Power Stations – 39 Units – 7900MW

1970’s, 80’s & 90’s
Coal - 8 Power Stations – 48 Units - 30’000MW
Non Coal – 6 Power Stations – 6280 MW

Annual Construction Rate - > 1250MW (sustained)

including

Industrial & Mining:
Sasol 2 & 3 – Coal to Liquid Refineries
Mosgas – Gas to Liquid Refinery
3 Aluminium Smelters and Mining

Enablers: Regulatory – Finance – Skills
Enter 21st Century: - Reactive

Power Supply-Demand Imbalance:
• 4800 MW Medupi Power Station (Coal)
• 4800MW Kusile Power Station (Coal)
• 1330MW Ingula Power Station (Pumped Storage)
• Development of a balanced IRP

2010 World Cup Soccer:
• Stadiums
• Airports/Harbours
• Roads
• Accommodations
• Gautrain

Security of Supply & Climate Change:
• Regulatory Framework for IPPs (pending…!!)
• Intensive Energy Users Captive Power
• Wheeling of Power on the Grid (pending…!!)
• Renewable Energy Feed In Tariff (fast tracking…??)

Exit 1st Decade:
Climate Change – Energy Gap – Economic Growth - Unemployment
Challenging the Nuclear Construction Gap

Where we are

• Understanding the “Uncompromising Regulatory Environment”
• Developing a culture of Unparalleled Quality and Safety (Q1 Gap Analysis)
• Developing and Retaining Skilled Resources (Long Term)
• Localising high-value Construction Risk (Unconventional)

Where we need to be

GROUP FIVE
structured ingenuity
Contracting Structures for the Nuclear New Build
**Potential Procurement Structures**

- **High Experienced Sponsor** – Component or Multi Packaged procurement approach and manage packaged interfaces with the assistance of an EPCM.

- **Medium Experienced Sponsor** – Island approach. (NI – CI – BOP/CW) manage major interfaces

- **Less experienced Sponsor** – Turnkey EPC approach by placing the full construction, interfacing and performance risk on the NSSS supplier and EPC consortium.
**Potential EPC Contracting Structure**

**NSSS Prime Model**

- Utility/Sponsor
- EPC Contract - 85% fixed Localisation Maxed (phased)
- EPC Consortium
- NSSS Supplier
  - Training
  - Conventional Island OEM
  - CI OEM Subcontractors
  - Major Construction JVs
  - Construction Subcontractors
  - NSSS Subcontractors

**Risk Mitigation:**
- Inter-Island Interface Risk
- Performance Guarantees
- Completion Guarantees
- Controlled Nuclear Compliance
- Limiting the risk to Sponsor
- Balancing Risk and Price

**Close Collaboration required between the major Industry Stakeholders as early as possible**
Developing a Nuclear Safety & Quality Culture in Construction
“We need to understand and manage Construction Risk within: Market Risk – Regulatory Risk – Legal Risk – Political Risk – Environmental & Social Risk – Operational Risk”

“Besides its technical complexity, the management challenges posed by a nuclear new build are often underestimated and call for professional management of nuclear new build ventures”

- Establishment of a Certified “Center of Nuclear Competence and Governance”
- Procuring Qualified and Certified Nuclear Engineering/Management Skills
- Resource and Implement Nuclear compliant Codes, Safety and Quality Systems
- Training and Development of Nuclear Construction Resources (ISO 3834-2)
- Enforcing Nuclear Compliance in Construction & Commissioning to Int.BP
- Demonstrate to Regulator and our Partners our “Organisational Readiness”

High upfront costs – Timing!
Localisation of Nuclear Power Plant Construction
Making Nuclear Localisation a Reality

Drivers:
• Government’s demand for Localisation
• Creation of a wide spectrum of careers in power & mining
• Development of a world-class nuclear culture in South Africa
• Capture the legacy left by the PBMR program
• Our Civil skills are best prepared for the Nuclear build

Challenges:
• An uncompromising regulatory environment (SHEQ)
• Lack of qualified skills for nuclear development & construction
• Long range skills development programs and to retain them
• Interface complexity between engineering and construction.
• Government Support – Launch – Risk Sharing – Training
Opportunities for Nuclear Localisation

- Development of a vast number of quality jobs in:
  - Corporate Engineering
  - Technical Engineering
  - Manufacturing & Construction Materials
  - Construction & Commissioning
  - Operations & Maintenance
  - Education and Training
  - Industry Support Services
  - Regulatory Services

- Strengthen international bilateral relations and support

- Four Units in the Eastern Cape has the potential to realise the Coega IDZ vision.

- A nuclear fleet will officially put South Africa back into the global technology arena where it belongs.
“Nuclear New Build today is more a Management and Regulatory challenge than a Technology challenge” ADL
dmuller@groupfive.co.za

Thank You