Lessons Learned in Localising Nuclear Construction in SA

Des Muller – Chairman for NIASA Supply Chain Development Committee
Thought Leadership session.....

Is a large scale Nuclear New-Build Program feasible for South Africa?
South Africa’s Electric Energy Trilemma

Energy Security
(Supply vs Demand)

Environmental Sustainability
(Climate Change)

Energy Equity
(ACCESS & Affordability)
Load Shedding!!!
In light of South Africa’s future energy challenges, is a Nuclear New-Build Program still negotiable?
The Energy Construction Landscape in South Africa
9600MW Super Critical Coal Power Plants under Construction

Kusile - July 2015

What impact has this mega-build had on our economy?
The Energy Construction Landscape in South Africa

- South Africa has come off a 2010 construction boom with two major coal power builds still in progress.

- 20th Century Power Plant manufacturing and construction capabilities were lost but are now being recovered at a significant cost.

- The SA Construction sector is under extreme pressure. Renewable Energy has provided some short term relief but has favoured international suppliers and constructors.

- A universal solution needs to be found to resolve the uncertainty in our labour force.

- Mega builds are demobilising our best Civil Works resources. **Opportunity lost for NNBP**

- Civil works remains a major strength in SA. Mechanical works seems to have Quality and Management/Supervisory challenges.

- Advancements in BIM technology is attracting the youth back to Engineering and Construction
Nuclear Construction Landscape in South Africa (Koeberg PTR)

- Group Five established its Nuclear Construction Services division in March 2011. Qualified 2015.

- The Koeberg PTR Tank replacement project brought major nuclear construction back to SA.

- Key stakeholders are: Group Five, Lesedi NS, NECSA, Columbus, Areva, Eskom and NNR.

- Local Nuclear Industry Standards are stringent but administered well by the relevant parties. Much more complex working inside Koeberg.

- Implementing nuclear standards and technical code requirements is intensely demanding on management, supervision and craft labour.

- Developing a Nuclear Safety Culture within a conventional construction crew needs more work than we anticipated. HP Training NB!

- Balancing Organisational Viability and Nuclear Safety needs special attention in a nuclear construction environment for Sustainability.
Nuclear Construction Landscape in South Africa (Koeberg SGR)

• The replacement of old steam generators is one of the more sophisticated projects in the nuclear industry.

• RD0034 Q1/L1 quality and safety requirements compounded with ASME III and XI codes inside containment is a welcoming stress test for our local nuclear industry.

• This project is a great prelude to the NNBP in demonstrating the pinnacle of our localisation potential with an international nuclear vendor.

• Replacing the SGs in a short outage requires years of readiness planning and world-class project management and construction skills.

• While the Koeberg upgrade projects are great incubators for local nuclear talent, we should try not to loose this valuable momentum.
Lessons Learned in localising Nuclear Construction in SA.

- Make sure your nuclear business is adequately established and fit for purpose for 360° viability.

- Nothing can prepare you for the challenges Nuclear Construction can throw at you. Be ready!

- Nuclear Project Readiness programs are vital before site mobilisation. Know the technology!

- Nuclear is different. Changing practices from other industries is extremely difficult. Reset!

- Successful implementation of nuclear industry quality standards is a collective achievement.

- Implementing a Nuclear Safety Culture is sometimes intangible and needs massive commitment from everyone and time of course.

- IMS, Project Management, Supervision and Human Performance Training are key to success.

- We have achieved it on a small scale so nuclear localisation is possible if approached realistically.
Challenges in Aligning SA Construction to a Nuclear Build Program
Unpacking Local Nuclear Construction Opportunities

Nuclear Island (40 to 50%)
- Primary Circuit

Conventional Island (60%)
- Secondary Circuit

Balance of Plant (70%)
- Tertiary Circuit

Nuclear Island Requirements:
- Highest Nuclear Regulatory & Code Requirements
- International Partnerships are essential
- A Mature and Pervasive Nuclear Safety Culture

International Industry Standards:
- ASME – (USA & SA)
- RCC-M – (France)
- KEA – (S Korea)
- JSME – (Japan)
- GOST – (Russia)
How Ready is South Africa for NNBP?

- Supporting Infrastructures will be a great stimulus for the local communities and help prepare them. (EC/WC).

- SA Construction is capable of delivering major scopes of work on the Conventional Island and Balance Of Plant.

- Construction on the Nuclear Island can also offer great opportunities for SA provided we prepare well in advance.

- Qualification in Nuclear Safety Classified Construction is a major undertaking. Competence in execution is a much greater challenge, even on a smaller scale.

- “Nuclear Construction is more a Management Challenge than a Technical Challenge” KPMG. (Not an SA culture)

- Our embattled South African construction sector will be challenged to prepare for a Nuclear Build Program without a well thought-out and structured SA Inc. strategy.

- Localisation for Phase 1 can range anywhere from 20 to 40% depending on how advanced South Africa’s readiness strategy is and its drive toward developing a flourishing and prosperous nuclear knowledge economy
Aligning SA Construction to a NNBP

- South Africa has a proud Power Generation Construction heritage across all the primary energy technologies.

- However today’s construction industries has new interests, needs and challenges that also needs to be managed.

- South Africa has an established and well-regulated nuclear industry capable of supporting a NNBP.

- However, a top-down expansion is needed in our nuclear industry to meet the localisation objectives for a NNBP.

- Qualified Nuclear Resources are available thanks to the existence of Koeberg, NECSA and the PBMR program. Investment in the next generation will need to be a priority.

- Government stimulation is needed to get South African companies to start investing in Nuclear Manufacturing and Construction capacity. UK model could offer guidelines.

- Although NIASA provides guidance and alignment, the “South African Nuclear Industry” can only materialise for real once a Nuclear Vendor Country has been announced.

- Nuclear Readiness & Quality Management Programs. NB!
So, Can we make this happen?

In the right enabling environment and with the right partners.... Yes!
Thank You

“Nuclear Construction is our Business”