National Workshop on Industrial Involvement

EPC Negotiations

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Content

South African Nuclear Objectives

The objectives of the South African nuclear programme, are:

- Establishment of the nuclear build programme in RSA for sustainable security of electricity supply
- Adherence to international safety standards
- Creation of RSA technology and industrial capacity competitive in world markets
- Developing a largely domestic nuclear fuel cycle
- Nuclear programme economics in RSA competitive against other local electricity generating options
- CO2 reduction objectives in line with SA government policy and anticipated regulation

Source: Nuclear Energy Policy

SOUTH AFRICAN NUCLEAR BUILD PROGRAMME

- *Eskom's nuclear programme is a component of a broader national programme* - The Eskom Nuclear Power Plant Programme (NPPP) can be considered to be one of 6 programmes making up the Nuclear New Build Programme (NNBP). Other programmes are the Necsa and NRWDI nuclear fuel programmes, the Necsa CPR/MPR and the enhancement of a national nuclear industrial base. These can be defined as:
  - *Nuclear Power Plant Programme (NPPP);*
  - *Nuclear Fuel Cycle Front-End (NFC F-E) facilities and services;*
  - *Nuclear Fuel Cycle Back-End (NFC B-E) facilities and services;*
  - *Multi-Purpose Reactor (MPR)* – for research and development and the commercial production of radioisotopes, treatment of materials and other commercial applications;
  - *The enhancement of the national infrastructure necessary to support the nuclear power programme;*
  - *The establishment of a sustainable industrial capability and service base to support the nuclear power programme throughout its lifecycle.*
- *Procurement* – In November 2016 Cabinet mandated Eskom to procure the NPPP and Necsa to procure the NFC F-E facilities.
- *Coordination and achievement of national objectives* - Coordination's is required between the mandated organs of state to manage synergies and to ensure the overall achievement of national strategies and planning imperatives (economic development, industrialisation, job creation etc.).
- *The DOE was initially mandated by Cabinet to coordinate the NNBP*

Eskom Approach to New Build

- Eskom's approach to the Nuclear New Build Programme is based on our experience with:
  - The successful Koeberg construction between 1976 and 1984 (contract to power),
  - Our negotiations with international vendors for Nuclear-1 in 2007/8.
  - The lessons learned from the Medupi, Kusile and Ingula projects.
  - International Experience on Imported and Domestic Nuclear Programmes.
  - The need to achieve:
    - the lowest credible cost and project risk,
    - the highest local content and
    - the maximum, sustainable long term industrialisation in SA

Development and Use of the Eskom Nuclear -1 Project User Requirements Specification

Development of the Nuclear 1 URS

- First URS developed by Eskom for commercial LWR NPP.
- Eskom wishes to purchase standard plant.
- Draw on worldwide trends and OE.
- Maximise credibility for nuclear licensing.
- Limited Time and Manpower
- Solution – Use an existing internationally acceptable Requirements Document
- Eskom selected the European Utilities Requirements Document and augmented it with relevant Eskom and South African Requirements.
- Took into account learning from Eskom Major Capital build Project Experiences; for example PBMR, Medupi Project, Simunye, OCGT, URS'.
- Multi-disciplinary cross-functional review. Internal to the company as well as external

Eskom Nuclear 1 ERS

The Eskom Nuclear 1 Employers Requirements Specification, comprises of the European Utilities Requirements specification, Volumes 1, 2 and 4

with specific amendments and deviations that originate from specific Eskom and current South African regulatory requirements.

Process for development of ERS

Review of EUR document.

- Expert Reviewers (10 Years experience minimum) used from within the Eskom
- Brief was to Identify any differences in the EUR to Eskom and RSA requirements.
- Differences was noted, screened and incorporated into a “Differences file”.
- Additional Requirements identified, screened and added to the Differences File.

Development URS Draft A

- PBMR - URS basic framework initially used.
- Draft A Developed = PBMR URS + Differences File + Additional Requirements.

Review

- Draft A Issued for an internal Eskom Review
- Draft B issued for External reviewed by British Energy, the National Nuclear Regulator,

November 2001 Rev 0 Published and included in the Nuclear-1 Bid

Continual Improvement: Post Negotiations

- 40 Specific additional URSs developed to augment weak areas in the ERS (notably outside plant).
- Included post Fukushima learning and thinking

Generic scope identified for a nuclear power plant

The number of power plants and sites required will be informed by the IRP, outcome of EIAs, seismic studies etc.

Off-site: outside the owner's control boundary

Owner's Scope*

- Roads
- Harbors
- Transmission integration
- Temporary visitor's centre
- Temporary offices
- Buildings (disaster management, emergency control, environmental laboratory etc.)
- Construction village
- For off-site infrastructure:
  - ✓ Water supply
  - ✓ Electrical supply
  - ✓ Sewage
  - ✓ ICT infrastructure
  - ✓ Physical security
- Social economic development:
  - ✓ Education
  - ✓ Health care
  - ✓ Safety and security
  - ✓ Transport
  - ✓ Etc.

On-site: within owner's control boundary

Owner's Scope*

- **Roads**
- **Site preparation**
- **Water supply**
- **Electrical supply**
- **Buildings**
- **Meteorological station**
- **Physical security**
- **ICT Infrastructure**
- **Interim used fuel storage facility**
- **Transmission integration**

Main Vendor Scope (EPC)

- **Nuclear Island**
- **Conventional Island**
- **Balance of Plant**
- **Nuclear fuel supply**

**Owner's Scope = Scope developed and executed by Eskom*

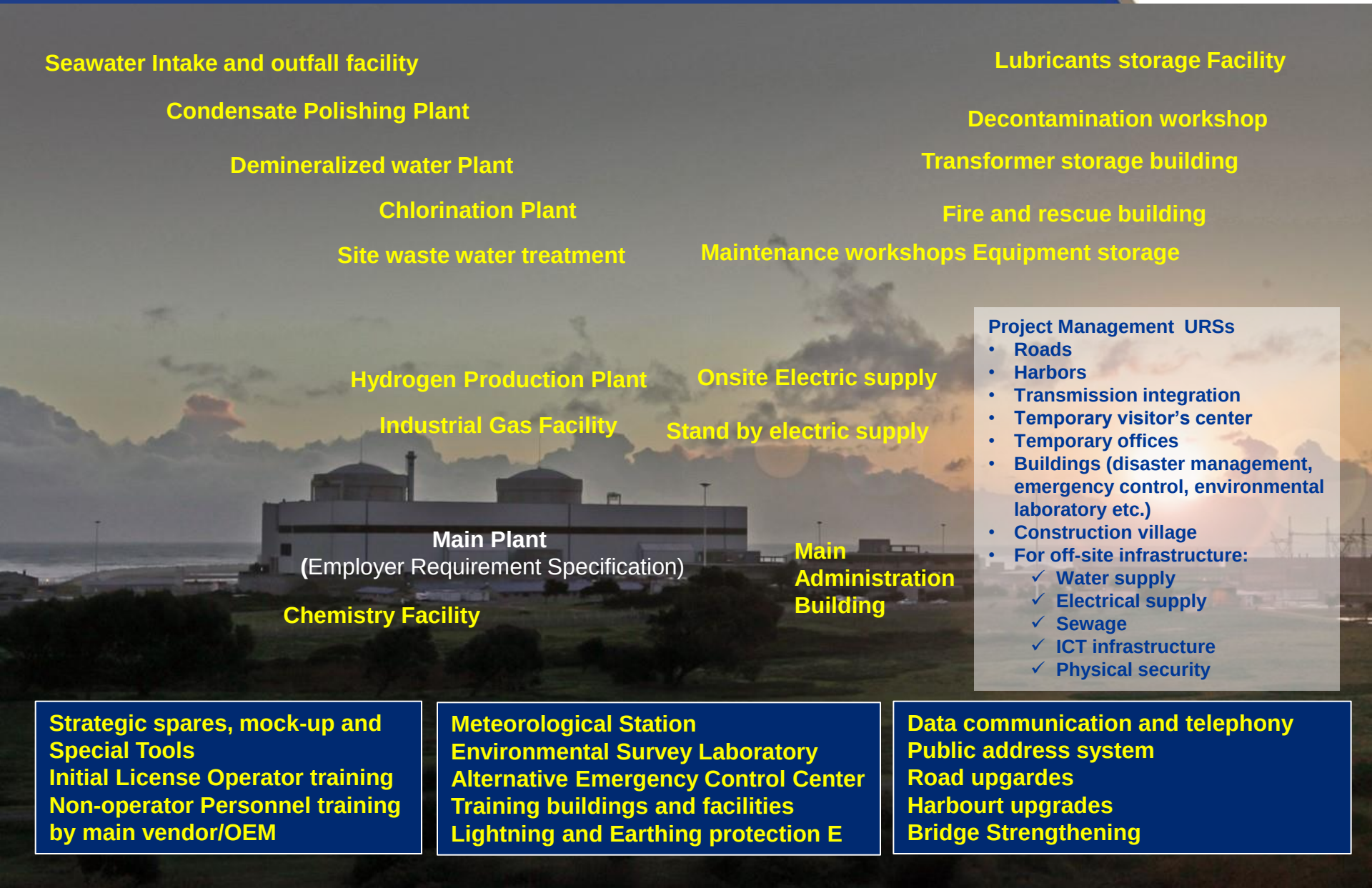
General supply and services:
Transportation, stationary, furniture, catering, landscaping, signage, waste management, personal protective equipment, security, cleaning, services, maintenance on-site facilities, operator training, general labour, rehabilitation of laydown areas.

To give effect to the nuclear power plant scope the following is further required:

- Site identification, characterisation and land acquisition.
- Site infrastructure requirement studies.
- Environmental impact assessments
- Permits and licenses
- Nuclear licensing
- Contract and procurement strategies
- Procurement
- Engineering work
- Supplier development and localisation strategy and studies
- Social economic development studies
- Finance and Funding plan
- Programme and project management activities (costing, scheduling, stakeholder, communication, risk management etc.)
- Investment decision making

The scope of a nuclear power plant is overall well defined and can slightly differ per site due to different site conditions and infrastructure that already exist. Factors such as the timing of the commercial operational dates, in-house capability, site conditions and interface risks with the main vendor design may result in some owner's scope being transferred to the main vendor scope. This still needs further investigation.

User Requirement Specifications



Seawater Intake and outfall facility

Condensate Polishing Plant

Demineralized water Plant

Chlorination Plant

Site waste water treatment

Lubricants storage Facility

Decontamination workshop

Transformer storage building

Fire and rescue building

Maintenance workshops Equipment storage

Hydrogen Production Plant

Industrial Gas Facility

Onsite Electric supply

Stand by electric supply

Main Plant
(Employer Requirement Specification)

Chemistry Facility

Main Administration Building

Project Management URSs

- Roads
- Harbors
- Transmission integration
- Temporary visitor's center
- Temporary offices
- Buildings (disaster management, emergency control, environmental laboratory etc.)
- Construction village
- For off-site infrastructure:
  - ✓ Water supply
  - ✓ Electrical supply
  - ✓ Sewage
  - ✓ ICT infrastructure
  - ✓ Physical security

Strategic spares, mock-up and Special Tools
Initial License Operator training
Non-operator Personnel training by main vendor/OEM

Meteorological Station
Environmental Survey Laboratory
Alternative Emergency Control Center
Training buildings and facilities
Lightning and Earthing protection E

Data communication and telephony
Public address system
Road upgardes
Harbourt upgrades
Bridge Strengthening

Evaluation and Negotiation Team

- The technical evaluation team comprised experienced staff specifically selected based on individual technical expertise in plant design and safety principles and collective experiences at Koeberg.
- The negotiation team under the leadership of the CNO comprised experienced individuals coupled with younger less experienced staff to gain the required experience and competence.
- Praised by bidders for using EUR document and overall manner and approach of conducting the negotiations.

Thank you