Eskom

NUCLEAR OPERATING UNIT
FUNCTIONAL ORGANISATION STRUCTURE (F.O.S.)
NUCLEAR ENGINEERING

Unique Identifier: 240-88257644

S. Touffé — Nuclear Engineering Manager

2021-05-31 — Date

PURPOSE:

- Establish and maintain all Eskom nuclear asset design basis
- Nuclear Design Authority for all Eskom nuclear installations
- Nuclear Engineering Centre of Excellence in Eskom
- Monitor and support the utilisation of the assets in line with the design and safety basis
- Optimise nuclear asset design, technical life cycle and production in partnership with the Operator.
- Technical conscience of plant

FUNCTIONS:

- Establish and maintain all Nuclear Installations Design Basis (including Operating, Maintenance , Inspection & testing bases) and Safety Cases
- Provide a design engineering service for Nuclear Installations
- Provide a Project Engineering service
- Provide systems engineering service
- Provide engineering support
- Provide, engineering programmes service.
- Provide a nuclear analysis service
- Lead Nuclear Research and Development
- Provide engineering discipline specialist within Nuclear Engineering (NE) and to Eskom where appropriate
- Perform technical analysis to support design, operations, maintenance, inspection and testing of Nuclear Installations.
- Ensure compliance with all relevant legislation affecting Engineering work
- Provide engineering leadership for clarification and application of design basis
- Provide engineering support for strategic asset management
- Provide technical basis and strategy for the decommissioning of nuclear plant
- Ensure that the engineering aspects of the licensing bases are appropriately managed (including licensing frameworks)
- Approve and control the use of engineering codes and standards for nuclear installations (e.g. ASME III)
- Identify, select, qualify, rezone and manage sites for nuclear power generation, to ensure its continued viability and the incorporation of the applicable nuclear requirements into the relevant local governmental planning documents in support of a national nuclear programme.
- Proactively identify deficiencies and recommend optimisation opportunities based on risk insights
- Establish, coordinate, manage the engineering risk management process and ensure compliance to NOU and corporate requirements
- Manage technical plant risks (including implementation of controls and treatment tasks)
- Provide engineering expertise, technical direction, support and assurance for NOU, over the life cycle of the plant (including decommissioning).
- Lead and support strategic engineering investigations, assessments and projects.
- Provide technical leadership in development and execution of Research & Development and other strategic nuclear technology initiatives for NOU.
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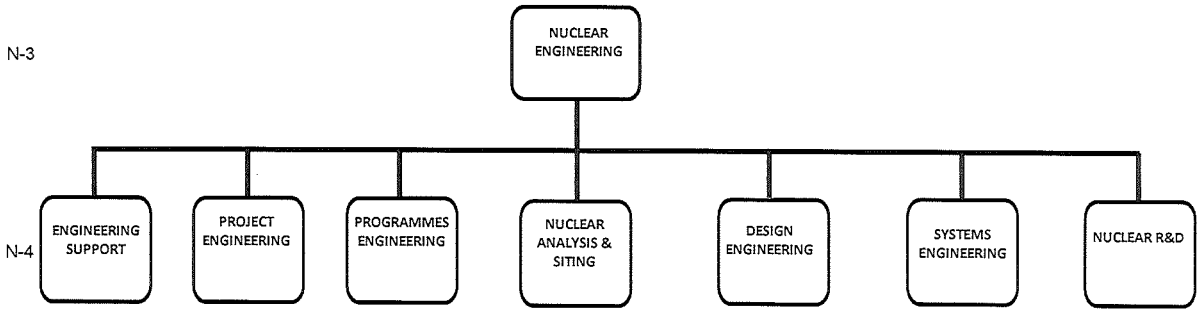

TITLE: Engineering Support

PURPOSE: Provide cross functional processes and management support for Nuclear Engineering

FUNCTION:

- Establish and maintain the NE Integrated Management System and ensure compliance to ISO 9001, RD-0034, NOU requirements and other relevant requirement.
- Coordinate and manage the Nuclear Safety Culture and Human Performance activities for engineering and ensure compliance to NOU requirements
- Coordinate, manage the Engineering risk management process and ensure compliance to NOU and corporate requirements
- Provide and control requirements for all NE processes in line with the quality management system.
- Manage and provide oversight quality management function of contracted suppliers for engineering services.
- Coordinate and monitor WANO, INPO EDF, NSA, NSRB, Licensing and QA concerns and performance gaps for improvement.
- Collect manage and integrate international Operational Experience within NE
- Coordinate and monitor the competency index of all engineering staff.
- Coordinate training requirements to address engineering competency gaps.
- Monitor NE CAP Health to ensure adherence to CAP Health expectations.
- Chair the NE-CAR and Engineering Curriculum Steering (ECSC) committees.
- Coordinate the non-conformance process
- Establish, implement and maintain the Document and Records Control processes for Nuclear Engineering.
- Participate in Quality Management Systems Audit and Assessment activities that focus on supplier capability w.r.t. participating in industrialisation and local manufacturing programmes.
- Custodian and provide oversight for the implementation of the Self-Assessment Programme.
- Monitor effective implementation of Knowledge management to the required requirements.
- Provide the relevant NE oversight reports on performance improvement programmes.

TITLE: Project Engineering

PURPOSE: Provide a Project Engineering service for all projects to interface between Eskom's design authority and the constructor, and to interpret and assure the engineering requirements during project sourcing, manufacturing, construction and commissioning activities.

FUNCTION:

- Provide and control requirements for the project engineering processes
- Organize the engineering work to support the program schedule/plan,
- Provide technical leadership and guidance and day-to-day direction of the assigned personnel
- Develop commissioning and decommissioning strategies and plans
- Provide engineering expertise during Project Sourcing
- Provide tender technical documentation, perform tender technical evaluations and provide technical input for contract award
- Participate with engineering input in the investment approval
- Ensure quality requirements related to design are adequately specified for services and projects prior to placement of contracts
- Provide engineering input to Project Quality Management Strategy and Plan
- Provide reviews and engineering input to Manufacturer's Quality Plan
- Review Manufacturer's Quality Control and Test Plan
- Perform Engineering Oversight during Manufacturing by performing Hold, Witness and Surveillance Interventions
- Request technical inspections and/or tests to be performed by utilising the Verification & Validation (V&V) capability
- Review and approve the manufacturer's documentation in terms of completeness and accuracy of content, requirements as contracted.
- Identify project oversight requirements
- Close-out of technical quality activities for projects
- Perform plant walk downs and the review and acceptance of the contractor's handover documentation.
- Provide Technical Assurance before and during commissioning
- Responsible for the Nuclear Licensing Framework for each project and obtain regulatory approval.
- Provide contract governance and oversight for NE
- Strategic management of Nuclear Installation assets and provision of an (Technical plan) Integrated Life of Plant Plan (LOPP) with regard to plant upgrades and decommissioning
- Lead the development and management of the Technical Plan.
- Review and consolidate applicable project requirements from various organisations
- Coordinate Periodic Safety Reviews, which includes the establishment of the scope and timing of the review and providing the resources for undertaking of the review;
- Provide regular and timely updates to the Chief Nuclear Officer and various stakeholders in the NOU on the progress of the review as and when required;
- Obtain Eskom agreement on commitments to identified improvements from the PSR;
- Drive and track all PSR deviations and improvements and other commitments stemming from the final PSR, to ensure closure and/or implementation in a timely manner, and all addressed before the next PSR.
- Develop and coordinate plans for Plant Life Extension as well as manage other engineering aspects related to Long Term Operation
- Develop and ensure implementation of strategies and programmes for industrialisation and local manufacturing, whilst complying with nuclear license requirements.
- Ensure verification (for industrialisation and local manufacturing programmes) is performed to confirm that components meets specification requirements.
- Provide support with the development of a comprehensive ASL that will support the Localisation & Industrialisation programmes.
- Development of user specifications for all new build projects (including specifications for site establishment)
- Develop and manage the vendor screening and technical assessment criteria for the various designs of New Nuclear Installations
- Development and management of site infrastructure strategies to support construction and/ or operations of New Nuclear Installations
- Ensure the development of processes and methodologies for technical assurance and compliance assessment of the proposed nuclear facility to performance, regulatory and safety criteria.
- Provide work management scheduling & planning functions to projects to ensure projects are well planned & completed timeously.
- Develop and administer departmental contracts.
- Oversee the development and maintenance of the implementation licensing and safety cases required during the project life cycle.
- Provide the locus of control on all engineering works from design through to the commissioning of New Nuclear Installations.
- Ensure that the overall requirements of the New Build Engineering programmes are appropriately defined, planned and consolidated for successful execution.

TITLE: Programmes Engineering

PURPOSE: Establish and control engineering programmes, special processes and provide specialist engineering support to ensure equipment and material reliability and enhance performance.

FUNCTION:

- Provide and control requirements for the agreed suite of ageing management, materials and equipment reliability engineering programmes and processes including LTO
- Provide and assure requirements for engineering programmes for maintaining existing design bases
- Develop and optimize maintenance strategies for the agreed suite of ageing management, materials and equipment reliability engineering programmes and processes.
- Develop, document and provide oversight on the implementation of engineering programmes and special processes within the NOU.
- Evaluate and prioritize programme/process work orders.
- Develop, document and implement plant reliability and maintenance analysis processes, with the aim of optimizing the preventive maintenance programme
- Establish the overall architecture and scope of Engineering Programmes as part of the licensing basis and asset management, including that for enabling Plant Life Extension and Long Term Operation
- Ensure the establishment and maintenance of programme objectives, bases, engineering requirements and criteria for each programme
- Monitor, review and trend programme/ process performance, implementation and health to ensure continued effectiveness of programme
- Approve or provide justifications for Programme Waivers (excluding PM Programme Defferals)
- Review outage scope related to programmes/processes.
- Provide input into life of plant plans for the long term management of the assets
- Systematically and proactively assess all degradation modes potentially affecting materials used for nuclear assets, provide recommendations for asset management and monitor application (Materials Degradation Matrix and Materials Issue Management Tables)
- Provide specialist engineering in support of equipment and materials reliability and to resolve equipment issues.
- Review OE and identify actions to address programme impacts.
- Custodian of Equipment Reliability Process for the NOU
- Maintain and control the Safety Related Surveillance Manual (SRSM)
- Custodian of "engineering work scope" for outage planning and execution.
- Develop and administer departmental contracts.
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TITLE: Nuclear Analysis And Siting

PURPOSE: Perform all Nuclear Safety Analysis (Probabilistic Safety Assessment (PSA), Deterministic Safety Assessment (DSA), Severe Accident Management (SAM)) , Reactor Fuel Management and Nuclear Siting in support of Koeberg power station, nuclear new build and AHTR in line with regulatory requirements and establishes a safety basis for all nuclear related activities within NOU

FUNCTION:

- Perform thermal hydraulic analysis for normal plant operations, transients, incidents and accidents
- Perform ex-core criticality, shielding, source term and heat generation analysis to support radiation safety
- Provide and control requirements for the nuclear safety basis process
- Develop and implement processes required for the identification, selection and qualification of sites
- Establishment of the envelope within which nuclear fuel can be safely used (KNPS, NNB, AHTR)
- Establish and optimise the fuel management strategy, license new fuel designs, and monitor fuel and core performance
- Support reactor operations by providing a neutronic , calculation capability and perform cycle specific core reload designs
- Manage and control nuclear fuel related activities, involving new fuel reception, fuel handling supervision and on-site fuel inventory for IAEA safeguards implementation.
- Perform probabilistic safety analysis to demonstrate licence compliance and to support plant engineering, operations and nuclear safety applications for risk informed decision making.
- Produce the PSA Risk Assessment Report to demonstrate compliance to the regulatory risk limits
- Proactively identify deficiencies and recommend optimisation opportunities based on risk insights.
- Select and maintains the required engineering analysis codes and methodologies in order to perform thermal hydraulic analyses for normal plant operations, transients, incidents, design basis accidents and severe accidents
- Perform thermal hydraulic analysis for normal plant operations, transients, incidents and accidents
- Perform ex-core criticality, shielding, source term and heat generation analysis to support radiation safety
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- Perform siting investigations required to identify, select, qualify and licence sites.
- Develop and maintain Site Safety Reports in support of the new and existing nuclear installations and maintain them current over the life of the sites in line with regulatory requirements, planned safety re-assessments, Safety Case updates and operational experience.
- Develop and implement monitoring programs required to quantify site characteristics of each nuclear site over the life cycle of the site.
- Develop and maintain nuclear site license safety cases for each nuclear site.
- Assess the radiological impact of existing and new nuclear installation on the public and the environment and determine the cumulative impact of all sources on site.
- Evaluate and assess the feasibility of developing and implementing emergency plans for all new and existing sites.
- Lead Environmental Impact Assessments for NOU.
- Provide specialist geospatial support to the NOU by defining requirements and evaluation of SSR outputs.
- Ensure technical adequacy and regulatory compliance for all siting activities.
- Develop and manage siting monitoring programmes.
- Interface and liaise with the regulator on site licensing issues, reactor physics (nuclear fuel) and nuclear analysis (PSA, DSA and SAM) and ensure resolution
- Identify, evaluate and quantify external hazards important to the design and safe operation of plant
- Develop and review/update comprehensive philosophies, and strategies, for the management of radioactive waste (Intermediate and low level waste), including operational waste, metallic (project) waste and decommissioning radioactive waste generated by Koeberg as well as by any future nuclear reactors operated by Eskom.
- Coordinate and facilitate stakeholder interaction, e.g. Necsa, NRWDI, DoE, NNR, for the approval of philosophies and strategies related to the disposal of Koeberg's RW.
- Provide advice, strategic and technical support to Eskom and Government on RWM.
- Develop and administer departmental contracts.

Nuclear Engineering Manager

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TITLE: Design Engineering

PURPOSE: Ensures that the final requirements, design, and analysis satisfy the design basis and control all changes to the plant design.

FUNCTION:

- Maintenance and control of the design bases.
- Provide and control requirements for the design process for NOU.
- Approve designs of new installations (and design changes to existing installations)
- Provide a design engineering service and support (for new plant, plant modifications, temporary alterations, minor design changes, updating FMECAs, safety justifications, Engineering problem resolution, support to RFE)
- Perform equipment classifications to control plant design, manufacturing, and procurement activities
- Produce detailed design documents to implement any change to the plant design
- Produce technical specifications (including technical requirements specifications and technical procurement specifications)
- Execute Installation design related Configuration (set point, margin update,)
- Custodian of the nuclear installations detailed design base
- Provide and control the set of Codes and Standards applicable to design at Koeberg and other nuclear installations
- Development and management of Concept designs for upgrades, improvements and replacements
- Designer and Custodian of Koeberg design documentation
- Perform supplier assessments and verification support for manufacturing, purchasing and qualification of equipment
- Perform equivalency studies, prepare and provide assurance for equivalency packages and ensure standardisation of equipment
- Provide, maintain and verify the hardware breakdown structure and classification lists for nuclear assets.
- Provision of assurance that Koeberg is designed and built in line with the design basis.
- Ownership of design bases
- Provide assurance that the design basis is adhered to by confirmation of alignment to engineering requirements
- Review and manage Koeberg's Safety Analysis Report (SAR)
- Provide and document engineering bases for plant design functions, features and set-points (including margins)
- Integrate hazards into the design of the Koeberg Power Station and development of strategies to mitigate their impact.
- Manage the Safety Evaluation Process
- Provision of engineering support for the EOP, FRP and SAMG bases, maintenance of the SAMG, and maintenance of the EOP and FRP background documents
- Establish and control processes for assessing issues for impact on design bases including Safety Evaluation process
- Development and management of accident, including severe accidents, management and mitigation strategies and bases
- Responsible for the layout of structures within the owner controlled area(s) of nuclear installations
- Establish the roles and responsibilities for the implementation and verification of the configuration management process and programme.
- Provide a drawing/ draughting service
- Establish and maintain the Configuration Management programme and standards for nuclear asset management
- Establish and maintain Configuration Management Plans (CMP) and liaising with vendors on their CMPs developed for nuclear power plant projects.

TITLE: Systems Engineering

PURPOSE: Ensure that the technical and economic performance capability (availability and reliability) of plant structures, systems and components is optimally monitored and maintained at all times to ensure sustainability of Koeberg Power Station's production goals and plans until end of life.

FUNCTION:

- Provide SSC expertise, optimisation of systems and initiation/championing actions that will ensure the ongoing performance capability of plant systems and components (including trouble shooting, root cause analysis and corrective action).
- Support the station during plant operability determination.
- Identify and resolve SSC technical difficulties that threaten the continued operation of the station.
- Act as a single point engineering contact to Koeberg for all plant operational issues.
- Assess industry related (Operational Experience (OE)) information on the system and initiate the necessary action.
- Develop long term/ life cycle management strategies for the SSC (LOPP) and prioritise its associated activities.
- Assess, monitor, improve and report on SSC performance and health.
- Advocate for timely resolution of production and nuclear safety technical threats.
- Identify, analyse and resolve repetitive equipment deficiencies and trends of degraded performance.
- Lead the development of the Engineering department outage execution resource strategy in support of the outage philosophy
- Provide a civil engineering operational service to NE
- Owner of the NE non-conformance process (the process to focus on NE as whole)
- Assist with identification of PM activities and their recommended frequencies.
- Assist in developing predictive maintenance plans using current technologies and industry-wide guidance for periodicity.
- Provide input regarding anticipated obsolescence, recommended actions, and potential sources of suitable alternative components or assemblies.
- Investigate causes of equipment failures that impede nuclear safety, reliability and emergency response.
- Provide an inspection and testing function to demonstrate integrity or operational readiness of safety or availability related equipment:
    - Obtain and understand programme or specific inspection/test requirements
    - Prepare appropriate technology, methods and procedures
    - Certify and authorise inspection/test personnel
    - Demonstrate inspection/test system performance
    - Establish inspection/test schedules
    - Perform or manage inspections/tests (functional control)
    - Evaluate, report and archive inspection/test results
    - Provide feedback and expert input into the development and optimisation of inspection/test programmes
    - Provides reporting of the equipment condition and corrective action, based on the inspection/test results
- Provide support on request for fault finding or diagnostic inspection/tests or non- safety/ availability related tests and inspections.

TITLE: Nuclear R&D

PURPOSE: Provide technical leadership in development and execution of Research & Development and other strategic nuclear technology initiatives directed to enhance local electricity generation capacity.

FUNCTION:

- Establish nuclear technology vision and select appropriate technology in line with strategic energy plans
- Perform market scans to establish knowledge base with respect to developments in Advanced Nuclear Technologies
- Collaborate with local (CSIR, DST etc.) and global institutions to advance nuclear industrial technological interests of the organisation
- Provide technical support to the development of competitive business cases for deployment of new nuclear technologies.
- Develop feasible strategies for the deployment of varying new nuclear technologies to augment Eskom's generation capacity.
- Function as a primary custodian of nuclear technology, innovation strategy and policy
- Provide an interface with Eskom Technology Groups on matters of technical governance to ensure consistency throughout the organisation
- Develop the framework for the deployment/ commercialisation of the Advanced Nuclear Technologies
- Ensure the demonstration of the proposed technology prior to deployment/commercialisation
- Initiate the engineering integration of proposed modern systems into the existing national grid
- Contribute to the development of software codes for the analysis of Advanced Nuclear Technologies
- Develop and administer departmental contracts.
- Lead the technical development of the Advanced High Temperature Reactor (AHTR) designs to the commercialisation of the most feasible option.
-