

	Manual	KUSILE POWER STATION
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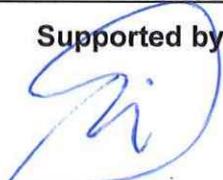
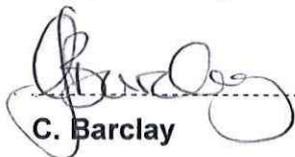
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1. Introduction

This Construction Manual defines the processes and project management elements used by the KET Construction Team to manage the execution of the Kusile Project. The information outlined in this manual is to assist ensuring the Project is completed in a timely and efficient manner, and that the designed and constructed works satisfy Eskom's contracted requirements.

2. Supporting Clauses

2.1 Scope

This manual shall cover all the Construction processes and how Construction shall be managed

2.1.1 Purpose

The construction's aim is to drive contractors in achieving the four critical success factors which are safety, schedule, cost and quality. Construction is dedicated to handing units over to Generation timeously, and to the required engineering specifications.

The information outlined in the manual is to help ensure the Project is completed in a timely and efficient manner, and that the designed and constructed works satisfy Eskom's contracted requirements.

2.1.2 Applicability

This document shall apply to Kusile Power Station.

2.1.3 Effective date

This document shall be effective from the date of authorization.

2.2 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] Data Books Review And Final Submission Process (240-134232676)
- [2] Commissioning and Completion of Kusile Power Station Project (240-125815990)
- [3] Supplier Contract Quality Requirements Specification (QM-58)
- [4] FIDIC and NEC Contracts and Guide notes
- [5] Eskom Project Management Policy (240-42872690)

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2.2.2 Informative

- [6] ISO 9001 2015 Quality Management Systems
- [7] Construction Regulations (Latest revision)
- [8] Occupational Health and Safety Act, Act No 85 of 1993

2.3 Definitions

Terms	Definition
Calibration	Set of operations that establish, under specified conditions, the relationship between the values indicated by a measuring system and the corresponding values of a quantity realised by a reference standard or a working standard
Certification	Procedure by which a third party gives written assurance that a product, process, or service conforms to specified requirements [ISO Guide]
Commissioning	Formal procedure for the addition of apparatus or systems to the existing system.
Competent Person	Person who complies with section A.1 (vii) of the OHS Act, 1993, and is in possession of a competency certificate for the classes of work in which he is deemed to be competent to work without constant supervision
Construction Supervisor	Person with on-site control of construction
Decommission	Removal of an item of equipment from the network for an extended period (a period exceeding three months)
De-energised	Disconnected from any live system.
Incident	Event of external or internal origin, affecting equipment or the supply system and which disturbs its normal operation.
Inspection	Visual or audible (or both) examinations that can be assisted by mechanical or electrical (or both) means, that will detect obvious unsatisfactory conditions or discrepancies.
Out of Commission	State of any apparatus that has been taken out of service and is not available for immediate use.
Prescription	Limitation by law of the time within which a claim can be made.
Quality	Fitness for purpose of a product or service.
Quality Assurance	Everything that must be done to ensure the quality of a product or service.
Quality Control	Verification of quality
Risk	Chance of loss, or the probability that an undesired event may occur, multiplied by the cost of that event if it does occur

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Risk Management	Managerial function which has the objective of protecting people, assets and profits of a business, by eliminating or minimizing the potential for loss from pure risk and the provision of funds to recover from losses that do occur.
Safety Equipment	Equipment or article, including protective clothing, which is manufactured, provided, installed or used in the interest of safety.
Standard	Document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.
Standard Specifications	South African specification issued in terms of the Standards Act, 1993 (Act 29 of 1993), provided that, until such time as a South African specification has been issued, the latest revision of another appropriate national specification or an appropriate International Electro-technical Commission specification shall be deemed to be the standard specification
Structure	Building or part of an installation or part of a plant, inside of which a lightning protection zone can be established.
Supervision	Overseeing of the actions of a person or persons to a degree sufficient to prevent any act which could be dangerous or in contravention of these regulations
Synchronisation	Process of adjusting clock frequencies to achieve synchronism of two time-varying, phenomena, time-scales or signals.
Verification	Execution of specified tests to measure the ability of a process or a person to meet specified criteria
Work	Refers to all physical activities in connection with apparatus, excluding operating activities and other non-dangerous activities that will not affect the health and safety of workers or the safe operation of apparatus
Work Permit	Document(s) for the authorization of all work to be done on any supply system or apparatus.

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2.4 Abbreviations

Abbreviations	Explanation
CM	Construction Manager
AFI	Application for Final Inspection
BOP	Balance Of Plant
CE	Chief Executive
CEO	Chief Executive Officer
CM	Configuration Management
CR	Construction Readiness
CS	Construction Supervisor
CTC	Construction Turnover Co-Ordination
CTO	Construction Turn Over
DM	Delivery Manager
ECM	Engineering Change Management
ECN	Engineering Change Notice
ER	Engineering Response
FCN	Field Change Notice
FGD	Flue Gas Desulphurisation
FIDIC	Fédération Internationale Des Ingénieurs-Conseils
FTQ	Field Technical Query
GC OMAC	Group Capital Oversight, Monitoring and Assurance Centre
GE	Group Executive
GM	General Manager
HR	Human Resources
IE	Internet Explorer
ITP	Inspection and Test Plan
KET	Kusile Execution Team
LSE	Lead System Engineer
MWP	Mega Watt Park
NCR	Non-Conformance Report
OBS	Organisational Breakdown Structure
PEM	Project Engineering Manager

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PEP	Project Execution Plan
PMP	Project Master Plan
PPC	Planned Percentage Complete
PFMA	Public Finance Management Act
QA	Quality Assurance
RFD	Request For Design
RACI	Responsible Accountable Consulted Informed
RCA	Root Cause Analysis
RFI	Request for Information
SC	Safety Clearance
SHEQ	Safety, Health, Environmental and Quality
SPF	Smart Plant Foundation
TA	Team Administrator
TL	Technical Lead
VFL	Visible Felt Leadership
VO	Variation Order
WWP	Weekly Work Plan

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2.5 Roles and Responsibilities

The structure is unitised. The Project's Team consists of the following.

- General Manager
- Delivery Manager
- Construction Manager
- Construction Supervisor
- Unit Planner
- Technical Lead
- Team Administrator

A detailed explanation of their roles is as follows.

2.5.1 General Manager

Heads the Delivery Managers Reports to the Group Executive (GE) of Group Capital.

2.5.2 Delivery Manager (DM)

Role

To lead and manage the construction execution effort of their respective Unit on time, cost, quality and adhering to the HSE prescribed standards.

Advise and collaborate with the FIDIC Engineer, Project Engineering, SHE and quality in monitoring work, and ensuring that work is executed in accordance with the approved design and meets contractual specifications.

Leadership

- Lead Unit Team to achieve agreed goals and objectives
- Develop and implement skills transfer programmes between high performing staff (including external expatriate) and those requiring further development
- Direct team (internal and external) efforts on common goals and promote open communication and team spirit
- Allocate unit construction resources to ensure adequate levels and capacity and *recommend changes (additional staff and training requirements)* for effective management of activities

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Construction**(i) Design Adherence**

- Provides support to TL, CMs and CS in conducting CR (Construction Readiness) as required.

(ii) Construction Planning

- Influence, interpret and implement strategies for the identification and mitigation of risks to ensure construction execution performance
- Direct, develop and implement corrective actions based on analysis of status / periodical reports such as NCR logs, Weekly Reports, RFI audits etc
- Incorporate Lessons Learnt from within and outside of project.
- Advance construction execution by liaising with Contractors, Engineering and FIDIC Engineer to drive priorities
- Prioritise construction schedule by engaging the project stakeholders to resolve integration conflicts
- Coordinate with other Construction Managers, and Contractors, to prioritise critical milestones in each unit and track the roll out of the programme on these milestones using the performance grid
- Ensure that the CM has created reasonable forecast dates for the completion of milestones, communicates these handover dates to Contractors
- Influence the development and revision of PMP
- Help remove constraints to facilitate construction progress.

(iii) Execution

- Escalate systematic HSE risks associated with each Contractor to Contractors' construction managers
- Resolve escalated issues with Construction Manager and Contractors' construction managers
- Develop strategies with Unit Team to mitigate escalating risks and non-conformances
- Coordinate with other Delivery Managers to ensure that Contractors' prioritization of resources across units gives priority to milestones identified as critical in each unit
- Apply broad knowledge on the process technology during construction to handover of assets/plant for commissioning
- Develop a perspective on the completion for critical milestones based on progress in the field, input from Contractors and Unit Planner
- Participate in the risk workshops and develop a detailed risk management plan for Construction to mitigate risks and defend schedule and cost for the Unit

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- Drive the progress on critical milestones by monitoring not only physical quantities against target but also PPC (Percentage Plan Complete) and forecast completion date on a weekly basis
- Chair Unit Integration Meeting, and participate in Area Integration Meetings as needed

(iv) Reporting

- Compile the Unit Monthly Dashboard with assistance from CM's responsible for Boiler, Aux Bay, FGD and Turbine / ACC areas
- Compile Unit Weekly and OMAC Report with input from CM's
- Compile Ad-Hoc reports for the General Manager or Eskom Board

(v) Handover to Commissioning

- Ensure that CM's are resolving issues so that work progresses to meet critical handover dates in schedule

2.5.3 Construction Manager (CM)

Role

The Construction Manager (CM) is responsible for delivery of a distinct area of the unit or Balance of Plant (i.e. Boiler, Turbine, FGD and Aux Bay). He is supported by Construction Supervisors (CSs) and reports to the Delivery Manager.

Contract Management

- Responsible for assisting the FIDIC Package Manager in adjudicating claims and variation orders and to provide information upon request e.g. confirm events have happened as laid out in the claim, that the sequence of events presented is correct, etc.
- The CM is to ensure that the daily diaries are stored in the secure drive
- Compile weekly Reports

Construction

(i) Design Adherence

- Initiate a Construction Readiness (CR) before construction begins on milestones as determined by CM's.
- Before the CR assist TL and CS in sourcing relevant documents, and
- Confirm that all latest revision approved documents are available

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- Familiarise with and understand relevant documents
- Liaise with Contractor and help identify ambiguities
- Work with Contractors to anticipate any RFIs required and ensure they are submitted before construction
- Obtain agreement with Contractors on a single set of documents to be used for construction
- Follow up on any outstanding issues, in particular closing out any outstanding RFIs
- Track all RFIs and NCR's and drive their quick resolution by liaising regularly with those currently responsible for that action
- Prioritise CTO's to be delivered

(ii) Construction Planning

- Forecast completion of milestones weekly based on progress in physical quantities (metric unit of measure to be determined prior to start of each milestone) as measured in CSs Daily Diaries, Contractors' weekly schedules and PMP
- Use forecasts to anticipate interfaces and handovers between Contractors, and assist Contractors in planning for them
- Ensure CSs understand each Contractor's weekly schedule and track daily progress against it; ensures he receives a weekly schedule from unit planners
- Identify critical path milestones using PMP
- Assist in determining which Programmes are necessary, and to ensure that Programmes are developed for critical milestones by Construction Supervisors
- Maintain a log of critical milestones for each area where the programme will be applied and ensure that the Programmes are scheduled in a timely manner
- Participate in the Programming sessions for critical milestones

(iii) Execution

- Tracks construction progress
- Track progress using physical quantities against Contractor schedules or PMP
- Understand, for each milestone, which physical quantities underlie percentage complete reported in Contractor's schedule
- Facilitate weekly review meetings to understand the reasons for good/ poor performance on their milestones, quantify the drivers for variations to plan
- Regularly check that Contractor resource availability is sufficient to achieve progress required by schedules
- Using Construction Supervisors' (CS) Daily Diaries, Contractors' weekly schedules/ Recovery Programmes and weekly work plans (when appropriate), trackers and PMP, provide weekly forecast of completion milestones in Weekly Reports

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- Participate in weekly performance reviews for critical milestones e.g PPC reviews to correctly identify the drivers for variations and identify issues
- Monitor the constraint logs for critical milestones and check that the constraints are being cleared and that work for the following week is constraint free.
- Transfer lessons learnt from one unit to another
- Ensure lessons learnt from previous units are not repeated by tracking that identified interventions e.g , changing method statements, updating drawings and procedures, implementing trackers etc. is being done by relevant parties
- Ensure relevant stakeholders in different units are aware of the lessons learnt at milestones.
- Ensure that milestones are met
- *Facilitate progress for an operational Power Station delivery and not Silo system*
- When progress is slow relative to schedule, CM identifies the root cause immediately with Contractors' site managers and finds a resolution.
- Track any outstanding RFIs and NCR's that can potentially cause delays in construction and handovers
- Track and reports on constraints, risk mitigation measures and access
- Work with the Contractor site managers to develop recovery plans
- Quality and HSE Assurance:
 - Ensure Data Books are reviewed in accordance with schedule, and ensure that Contractors are prepared for each planned inspection
 - Prevent, identify, resolve and follow up on systemic HSE risks by Package (e.g. unsafe conditions and acts) and execute mitigating action
 - Complete Visible Felt Leadership (VFL) forms and take required action and accountability

(iv) Reporting

- Compile Weekly report and GC OMAC report for his area
- Compile Ad-Hoc reports for the General Manager or Eskom Board

(v) Handover to commissioning

- Coordinate and facilitate access to work areas as required by Contractor's schedules or for when commissioning handover is forecasted
- Ensure all quality required documentation is on track to be complete prior to scheduling handover, including data books and/or sufficient documentation required for handover

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2.5.4 Construction Supervisor (CS)

To collaborate with, and coordinate the Contractor's works in driving the four critical success factors of safety, schedule, cost and quality.

Role

Construction Supervisors are KET's 'eyes and ears' and are the first to know of any potential issues that may delay construction progress. They are an important conduit of information between a number of Departments at Kusile. They are the first point of contact between the Contractor and KET and provide line of sight on project progress for KET Executive Management. In particular they provide crucial early warning of potential delays on site and play a critical role in resolving issues to allow construction to proceed. Finally, as part of the SHEQ system, Construction Supervisors monitor and track Contractor performance during construction and act accordingly to resolve issues as they occur.

Construction

(i) Design Adherence

- Track Inspection and Test Plans (ITPs) for each milestone daily and records in Daily Diary whether items are at risk of failing inspection
- Ensure Contractor adhere to quality plans and submits Data Books in accordance with the schedule
- Refer to updated drawing register maintained by Engineering for all areas under his/her control, including red line drawings in case black line drawings are not yet available
- Assess if construction progresses according to latest design drawings

(ii) Construction Planning

- Understand priority milestones identified by CM and Delivery Manager
- Understand for each milestone Contractors' schedule and float available for each milestone
- Schedule and participate in the Pull Planning sessions for critical milestones
- Attend the Construction Readiness (CR) to understand the potential risks and constraints to timely execution
- Based on information from the CR and Recovery Planning Session, develop and maintain a constraints log and a six week look-ahead schedule
- Monitor construction progress daily using physical quantities versus Contractor's schedule and Weekly work plans
- If progress does not meet schedule, they will elevate the matter to CM for resolution to identify root causes (or bring the issue to daily Contractor meeting, or Area Integration Meeting)

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- Work with Quality and Engineering to ensure testing and inspections required by the contractors occurs

(iii) Execution

- Track progress against the constraint logs or 6 - week Look Ahead plans
- Work with Contractors to maintain a view of available bulk works, or an addressable back log, to allow for dynamic planning if needs be
- Facilitate weekly review meetings to understand the reasons for good/ poor performance on their milestones, quantify the drivers for variations to plan by tracking deviations on a Pareto Chart, or other tools
- Periodically participate in Contractors' Daily Toolbox Talks to ensure safety information cascades to workers
- Influence daily plan where possible to facilitate construction progress
- Write Daily Diaries detailing progress, quality, and health and safety issues
- Track Contractors' resources to establish that there are sufficient resources to meet the schedule
- Document and resolve, or escalate to CM, issues inhibiting progress
- Track daily progress in physical quantities (metric unit of measure to be determined prior to start of each milestone)
- Identify, track, resolve and escalate HSE risks and take mitigating action
- When progress is slow, work with Contractors to identify specific solutions
- Liaise with Construction Team and Planning Department to review and analyse project plans and schedules and identify coordination/integration requirements
- Attend and participate in Area and Unit Integration Meetings
- Notify Contractor of integration goals and milestones and how they impact other Contractors through CM
- Drive milestone completion
- Review Application for Final Inspection (AFI) before it is submitted to Quality and identify any additional work required before formal inspection is scheduled
- Resolve, report and escalate when items in a milestone's Inspection Test Plan (ITP) are at risk of failing an inspection
- Transfer lessons learnt from one unit to another when appointed as discipline cross unit co-ordinator
- Ensure lessons learnt from previous units are not repeated by tracking that identified interventions e.g changing method statements, updating drawings and procedures, implementing trackers etc. is being done by relevant parties
- Ensure relevant stakeholders in different units are aware of the lessons learnt at milestones

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(iv) Handover to commissioning

- All Data Books are reviewed
- Plant is built according to specifications
- Liaise with the Commissioning Department
- Arrange pre-safety walk down during AFI submission
- Attend start-up meeting for plant safety clearance booking
- Take part in safety clearance walk down
- Ensure that plant is safely cleared

2.5.5 Unit Planner (UP)**Role**

Unit Teams are supported by a designated planner, seconded from the Planning Department (which is part of Construction) The Planner ensures two-way communication between the unit and planning. He/she operationally reports to the Delivery Manager, who provides input in terms of performance management of the role. The Unit Planner assists the Unit Team by investigating sequence changes that will drive the schedule and improve production He/she also shares planning lessons from the rest of the project

Construction Planning

- Provide the dates from the PMP for Construction Supervisors (CSs) and CM's to reference for Recovery Programme sessions
- Capture an electronic copy of the Recovery Programme in Primavera for reference and update based on feedback on field progress each week
- Assist CSs by capturing the 6 - week look ahead and constraint logs in the appropriate format
- Ensure all delays and updates are updated in the contractor schedules and are reflected as such in the PMP
- Verify the logic and accuracy of the schedule with relevant CM
- Provides contractor schedules to the CM and CS as needed
- Provide the CM with.
 - o Three - week look ahead schedule
 - o Critical path by area and system
- Responsible for progress reporting (include dashboards, unit 'wheels' and PMP reporting when necessary)
- Delivery Manager provides input in performance management of the planning role
- Update and issue Weekly Reports for Eskom GC OMAC committee
- Challenge contractor integrity and quality of schedules submitted for PMP updates

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Central planning

The Central Planning Department function on a higher level than the Unit Planner. They are working closely together with the Commercial Teams and Contract Managers

Central Planning are responsible to

- Dedicate resource to the unit
- Ensure the PMP is updated with contractor schedule information and reflects a realistic view or status of the project
- Develop and maintain slippage reports from the PMP
- Develop and maintain slippage reports from contractor schedules
- Develop and maintain Major Milestone Reports, Forecast vs Target dates
- Assist Commercial Department with Target and Forecast dates
- Capture and import contractor weekly submitted schedules on Eskom data servers
- Maintain contractor schedule submission reports to Commercial Department and Contract Managers
- Engage with contractor planners and managers when their work appears to be on the PMP critical path. If a dead lock is reached, take the matter up with the Contract Manager for further action
- Provide Unit Planners with sufficient information from the PMP to challenge the contractors and to guide the Delivery Managers with regards to the time line and schedule risks
- Administrate the Kusile Primavera software (user access, user profile management, user security, general security, OBS, WBS, activity codes, etc.)
- Develop, maintain, and distribute the Fish Bone reports for all units.
- Assist when users are unable to log into Primavera
- Assist the Unit Planners and Delivery Managers where needed

2.5.6 Technical Lead (TL)**Role**

Unit Teams are also supported by a Technical Lead (TL). The TL is a link between Construction, Commissioning and Project Engineering, supporting the Delivery Manager in resolving engineering issues as they arise. The TL is part of the Project Engineering team and participates with other team members, of all disciplines, in ensuring the technical integrity of a fully functional and operational plant that meets the end user requirement, expectations and requirements.

While it is the Contractor's job (with some oversight from Engineering) to ensure work proceeds as per the design specifications, the TL ensures that the correct and most up-to-date designs are being used. He pre-empts issues by planning work in advance and checking all engineering information is correct. The TL also informs his unit about design changes, and lessons learnt from other units

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The TL Reports (solid line) to the Project Engineering Manager (PEM). He is a key link to ensure that the plant, as built and commissioned, is fully aligned with the design baseline, operating technical specifications and maintenance baseline. He does so by plant interface management, systems design reviews, and resolution of ad-hoc integration issues. The TL is responsible for Design integration and is the keeper and source for the latest updated construction documents (drawings, RFI's, ECM etc)

Construction

(i) Design Adherence

- Assist System Engineer in obtaining timely responses from Design Engineer
- Obtain relevant information for Construction Readiness (CRs) before milestones begin and access is given to new Contractors
- Arrange readiness review meetings to provide assurance that all system plans are well integrated
- Pro-actively provide assurance that the quality of design drawings meets requirements of construction stakeholders
- Liaise with Construction and Commissioning teams to verify that the plant and systems are ready for commissioning
- Chair and authorize these reviews to provide the assurance that integration has been done properly
- Update drawings register as and when changes occur

(ii) Construction Planning

- Participates in pull planning sessions, and provides advice on how to resolve outstanding design and engineering issues
- Identification and mitigation of risks by liaising with PEM / Designer to ensure construction execution performance
- Lead/co-ordinate arrangement of design issues and clashes
- Collate incomplete as-built, red line drawings, Site Instructions (SI) and Field Change Notice (FCN) as part of latest construction documentation.

(iii) Execution

- Monitor Contractor activities to ensure compliance with SHEQ, technical integrity requirements and that all documentation is in place
- Report on engineering and design risks and mitigation, and non-compliance with standard procedures, to management
- Resolve inter-disciplinary engineering issues that have an impact on construction schedule
- Stop construction in cases where construction poses a safety risk or, quality and engineering standards are compromised

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- Interrogate and verify declaration by Lead System Engineers, about system readiness for commissioning.
- Identify and resolve cases where construction may compromise design intent
- During construction apply broad knowledge on process technology to initiate smooth transitioning to Commissioning Engineer
- Resolve Field Technical Query on site, where possible

(iv) Handover

- Assist with commissioning engineering integration support
- Ensure that the correct assignment of responsibility is given to an applicable Design Engineer during commissioning
- Identify opportunities for improving commissioning through better integration of disciplines & Packages
- Help coordinate and facilitate handovers by removing constraints
- Participate in pre-Safety Clearance (SC) walk downs
- Assist during Application for Final Inspection (AFI) submission and ensure all necessary documentation for CSs are in place and in order
- Participate in plant walk downs during SC and handover to Commissioning

2.5.7. Team Administrator

Role

- Provide administrative and secretarial support service
- Provide a general office administrative function
- Provide a one-stop client service
- Process data from information systems

Functional outputs and activities

(i) Providing Administrative and Secretarial Support

- Utilise different applications to produce documents that conform to recognised standards and formats as prescribed by Eskom.
- Organise and arrange functions and meetings as required
- Receive visitors and customers on behalf of Delivery Manager
- Prepare presentation material and provide background material on request
- Take minutes at Unit meetings

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- Screen telephone calls when requested
- Respond to telephone enquiries which require general routine answers
- Control the flow of work in the absence of the Delivery Manager by directing requests to the appropriate employees and providing the Delivery Manager with feedback

(ii) Provide a General Office Clerical Function

- Direct people / enquiries to relevant person
- Administrate a complete filing system
- Administrate the dispatching and receiving of documents and goods
- Administer the stationery requirements and stock for the department
- Coordinate training schedules
- Ensure standby lists are updated and valid
- Assist Unit Team with the correct use of documentation

2.5.8. Construction Supervisor

The KET Construction Unit Teams in general are responsible for

- SHEQ
- Coordination, tracking and monitoring
- Reporting
- Schedule recovery
- Contractor interfaces and handover to commissioning
- Design compliance
- *Data collection*
- Access and re-access issuing

Unit Teams are not responsible for

- Contract Manager issues
- Giving instructions to Contractors
- Engineering or technical approvals
- Issuing or responding to RFI's, NCR's or other ECM's
- Signing off or accepting a part of completed work (including performing quality inspections)

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The duties of the DM, CM and CS follow a cycle for each construction milestone

1. Set the preconditions for design adherence
2. Plan the work
- 3 Assist with execution
- 4 Report on its progress
- 5 Facilitate a handover. Specific activities for each step are discussed in the subsections below

2.6 Process for Monitoring

The processes shall be monitored by means of audits

2.7 Related/Supporting Documents

Refer to the latest revision of the documents stated below.

- Construction Daily Diaries (240-128363265)
- Weekly Report (240-152243771)
- Access Certificate Request (240-152389031)
- Method Statement Template (240-124877272)

3. Document Content

3.1 Process Step

The parties or stakeholders responsible (**R**) and accountable (**A**) or to be consulted (**C**) and/or informed (**I**) relative to the implementation and maintenance of this QMS procedure are defined in the Procedure RACI Matrix documented below.

Table 1: RACI Matrix – Construction Daily Diary Process

Process Step	Construction Manager	Construction Supervisors	Team Administrator	Construction Manager
Completion - Construction Daily Diary forms to be completed by each site supervisor to the required detail on a daily basis	A	R		I
Sending - The completed forms to be electronically stored in a file not longer than a week and sent to Team Administrator daily	A	R	I	I
Security - Team Administrator to upload the Construction Daily Diary to the secure drive	A		R	

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Table 2: RACI Matrix – Weekly Report Process

Process Step	Construction Manager	Delivery Manager	Assurance Personnel	Team Administrator
Completion - Report to be completed by each Construction Manager to the required detail by Thursday each week	R	A		
Sharing – Report to be sent by Construction Manager to Delivery Manager	R			
Review – Delivery Manager to review the document and add comments to the executive summary		A/R		I
Collation – Delivery Manager to send document to nominated person in the Assurance Dept who collates and compiles all reports for Eskom management		R	A	
Security - Team Administrator to upload the Construction Daily Diary to the secure drive		A		R

Table 3: RACI Matrix – Dashboard and OMAC reports

Process Step	Delivery Manager	Construction Manager	Unit Planners	Team Administrator
Sharing information – Construction Manager to supply their areas updates to the Unit Planners	A	R	I	
Compiling – Unit Planner compile data in line with the reporting period	A		R	
Sharing Dashboards – Unit Planner to submit completed dashboard to the Delivery Manager for review and any additional comments	A		R	
Sharing Dashboards - Once data has been confirmed the planner is to submit the dashboard reports to the Delivery Manager, Unit Planner, and Construction Manager	A		R	
Sharing Dashboard - Copy of the dashboards to be submitted to the Team Administrator	A	A	R	I
Storage - Team Administrator to save file on the secured drive	A			R

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Table 4: RACI Matrix – Construction Readiness

Process Step	Construction Manager	Lead Discipline Engineer
Collation - All information to be collated and the document populated	A	R
Meeting - Hold Construction Readiness with the relevant parties	A	R
Sharing - The document will be emailed showing actions and follow up	A	R
Review - Hold regular reviews until all actions are closed as and when required	A	R
Storage - Copy of report stored on secure drive for historical purposes	A	R

3.2 Reporting

3.2.1 Daily diaries

Construction Supervisors (CS) complete a Construction Daily Diary, submit to their Construction Manager (CM) by day's end and send to the appointed Team Administrator to load onto the secure drive weekly. Over the weekend, diaries are submitted by Construction Supervisors on duty.

The Diary has four functions.

- Records Contractor's activities for the commercial team
- Tracks progress of milestones for the Construction Unit Team
- Provides a template for the supervisor to keep track of issues and enables root cause analysis of the issues
- Identifies and tracks issues that require escalation and intervention, including issues that may cause future delays

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The purpose of each section is as follows.

- **Safety, Health, Environmental and Quality:** medical events, or near misses, are recorded here, and so are risks - unsafe conditions and unsafe actions - which may lead to SHEQ incidents in the future. This record allows the Construction Team to identify repeated risks associated with certain Packages
- **Photos:** Photos track progress (or lack thereof) on relevant milestones, and provide a record for the FIDIC Engineer that may be used in claims
- **Work Activities, Progress and Access Granted:** In this section the CS tracks all on-going milestones for each Package. Each milestone is broken up into activities; the start and completion dates of these activities are tracked. The CS tracks a single physical unit of measure (e.g. weld inches, m³ of concrete poured, tons of steel installed etc.) This tracking allows the CM to account for whether Contractors' reported completion dates are reasonable
- **Issues that may result in delays, stoppages or claims:** The CS tracks all on-going issues, and indicates whether they should be escalated to the Construction Manager. Issues escalated to the CM feed directly into the agenda of the Area Integration Meetings. **This includes** any items on the Inspection Test Plan (ITP) that are at risk of failing an upcoming inspection. This could include the fact that all documents are not in place and at the work front, data books are not in order, or a Contractor's internal inspection has not been completed

3.2.2 Weekly Reports

At the end of each week, CMs compile a Weekly Report and submit to their Delivery Manager. The Delivery Manager is to review and add any additional comments, this is then sent to the Assurance Department who will compile all reports into a single document. The Assurance Department will then send the completed report to all on the circulation list including the Construction Manager and General Manager

The Weekly Report main function is to

- To record weekly progress and good news for Eskom management.

The Weekly Report is distributed to Eskom management via the Assurance Dept. The purpose of each section is.

- **Unit Executive Summary:** This section includes information on the progress of the Unit that week, highlighting root causes of major constraints to the schedule, with recommendations of how to alleviate these constraints. It is important that constraints as well as achievements are highlighted, giving management a clear view of the situation on site.
- **Area / Milestone Overviews:** This section includes information on the progress of the specific area or milestone (Boiler, Turbine, FGD & Aux Bay) that week, and highlights root causes of major constraints to the schedule, with recommendations of how to alleviate these constraints.
- **Good news:** This section highlights positive achievements of the Unit Team over the past week; in particular focusing on how constraints have been resolved

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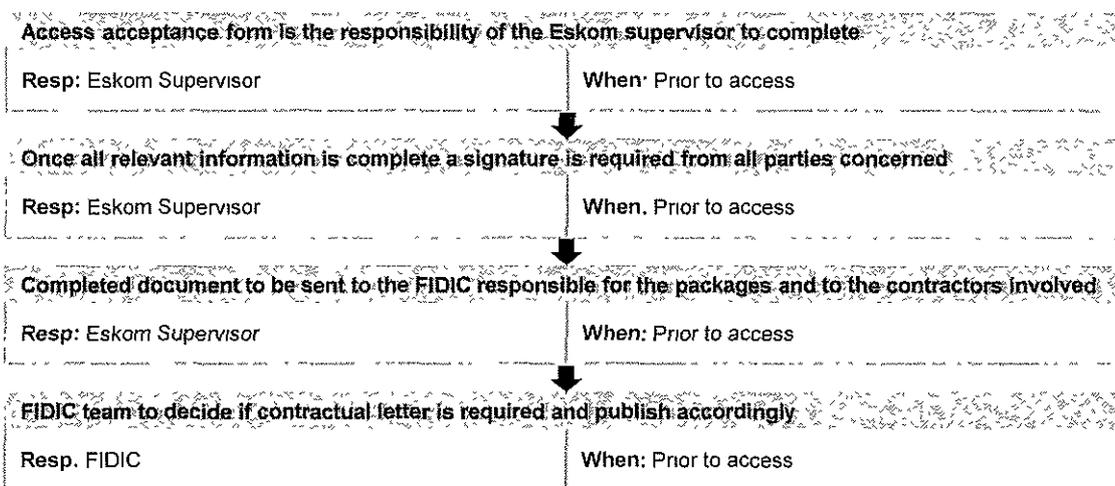
- **Photos:** Photos indicating completion of works, and slow progress, are shown. Again, a balanced view is presented.

3.2.3 Dashboards

Delivery Managers, in cooperation with CM's and the Planning Department, produce monthly Unit Dashboards. These dashboards include S-curves of progress in the Unit, important issues raised, current forecast completion dates, and an accounting of how forecast dates have moved over time.

The purpose of these dashboards is to provide high-level completion forecasts to the Construction Manager.

3.2.4 Access and Acceptance Forms



Once work has been completed in an area by a contractor an official document is required to handover access from one contractor to another. This document comes in the form of the **"Access and Acceptance forms"**. This document is the responsibility of the Unit Construction Supervisor to control as part of the coordination between contractors in his/her area. This document also controls if shared access is given ensuring all parties are in agreement.

3.3 Meetings

The Construction Team conducts a cascade of meeting designed to resolve issues that inhibit the progress of work and mitigate risks of delays and cost escalation. Each meeting is described in further detail below.

3.3.1 Daily Meetings

The Construction Team conducts a cascade of meeting designed to resolve issues that inhibit the progress of work and mitigate risks of delays and cost escalation.

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Tool-box talks and supervisor walk through: As part of the Construction Supervisor's daily interactions with the Contractor, he or she will regularly attend work planning meetings and work team meetings organized by the packages. Issues observed in these meetings will be escalated to the Construction Manager (CM) through the daily diaries.

Area Integration Meeting The CM will host a daily integration meeting to address issues in his or her area. All relevant Contractor Construction Managers and Subcontractor Managers from each package should attend. If the package hosts its own meetings with a similar purpose, these meetings may take the place of the Area Integration Meeting, so long as all Contractors required for smooth integration are present. In the early stages of construction, all three areas may meet on a daily basis.

Minutes for this meeting will be kept, with the boards photographed and circulated to relevant participants as required. Issues requiring escalation to the DM and CM or Package Site Managers will be documented with recommendations of action in the weekly reports.

3.3.2 Weekly Meetings

Unit Integration Meeting: The Delivery Manager will host a weekly meeting including all CM's, FIDIC Representatives and nominated Contractor Construction Managers to resolve issues related to integration of work across areas. At early stages of construction, this meeting may be held on a weekly basis, but as construction progresses and area integration issues become more important the frequency may increase so that the meeting is held daily and is eventually combined with the Area Integration Meeting into a single meeting.

Minutes for this meeting will be kept, with the boards photographed and circulated to relevant participants as requested. Issues requiring escalation to the Construction Manager or Contractor Construction Managers will be documented with recommendations of action in the weekly reports.

PPC Review Meeting: PMP milestones, the team involved reviews the previous week's activities and adjusts the plan for the following week(s). The PPC (Percent Plan Complete) is calculated to measure planning reliability. The team also identifies upcoming constraints and discusses issues in order to understand their root causes. Construction Supervisors, Contractor Supervisors and Foremen attend this meeting. The CM may also attend. See PMP section for further detail.

Construction Management Meeting: Delivery Managers, Unit Planner, will meet with the Construction Manager to discuss feedback and actions resulting from the Management meeting (General Manager Management team). The team will also give an update on general construction management issues and escalate unresolved issues to the GM **Weekly FIDIC, DM and Engineering Meeting:** The Construction Manager, FIDIC Package Managers, Delivery Managers, Commercial Manager, Representative from Engineering, Planning Manager and will meet to discuss inter-package construction, engineering, and contracts management issues.

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3.3.3. Other Meetings

Construction Readiness: A Construction Readiness (CR) should be completed before construction commences on each milestone. The process should be managed by the Construction Manager, who will work with the Technical Lead to compile the CR report.

3.4 Risk

Risk is defined as any issue that could potentially affect the outcome of the Project by causing a significant deviation from the Project's goals and objectives.

Risks are proven to contribute to most of the schedule and cost overruns on similar size projects. All Kusile Project entities, including Unit Teams and Contractors, are required to identify serious perceived short- or long-term risks to the Project's objectives. Potential issues are discussed with the Executive Management Team and, if the risk is deemed valid, it is analysed, and a plan is developed for mitigation.

3.4.1. Risk Management Plan

A formal Risk Management Plan has been implemented for the Project. This plan is used at all levels of the Project. This plan defines the risk management approach in terms of a formal process of identifying risks, analysing risks, developing mitigation plans / insurance programmes and tracking and reporting risk items through the duration of the project.

The Risk Management Plan provides a common format to ensure consistency in risk management and reporting across the Project.

Mitigation plans are developed for both external and internal risks. The risk identification and mitigation efforts for each Unit are coordinated by the Delivery Manager.

3.4.2. Role of Unit Construction Team

The role of Unit Construction Teams is to facilitate and track progress of construction, identify any risks and constraints and, if possible, resolve them. Issues and risks that are not resolved are escalated from Construction Supervisors to Construction Managers, to Delivery Managers, and then to the General Manager via various reporting tools. Recurring issues are added to the Risk Register and mitigation measures identified and applied to other units so as to prevent re-occurrence of issues. The Construction Team should attend the 3 monthly area risk meetings where their attendance is needed.

3.4.3. Managing Changes To The Project Baseline

This section covers the role of Unit Teams in managing changes to the project baseline (described as the "construction change management process" for the purposes of this document).

Identifying, communicating, and managing changes to the project baseline (design, schedule, cost, quality etc.) are the responsibility of all members of KET, as well as of Contractors, vendors and subcontractors. Change Management is to be continuously reinforced during the Project and changes are to be communicated to different parties.

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3.4.4 Construction Team role in Construction Change Management Process

The Construction Change Management process provides project leadership with a warning of conditions that might affect the project cost and/or schedule. This process allows the Project an opportunity to mitigate negative impact of the change. This is achieved by consolidating reports from Construction Supervisors all the way to the Executive Management Team.

The focus of Construction Change Management is to identify changes as early as possible, communicate them, and ensure all impacts of the change (e.g., cost, schedule, resources, constructability, etc.) are considered, so that an informed decision is made. The opportunity to positively influence the final result of the Project decreases as the Project progresses. Therefore, early identification is critical in order to manage and mitigate the negative effect of changes.

KET is responsible for managing handovers and interfaces between Contractors. A delay in a handover is likely to result in a claim. Eskom may be able to counterclaim from the delaying Contractor, but the process removes valuable resources better used elsewhere, and a successful counterclaim still cannot make up lost time. Unit Teams play a crucial role in minimising changes and Variation Orders.

CSs and CMs are responsible for collecting and maintaining data via Daily and Weekly Reports, which are a factual database of all construction issues. These reports are also memory aids for verifying any future claims and Variation Orders submitted by Contractors. CSs and CMs are also responsible for capturing and implementing design changes from other units through Lessons Learnt.

4. Acceptance

This document has been seen and accepted by

Name	Position
Desigan Naicker	Unit 2 Delivery Manager - Manager Projects
Vukile Dweba	Unit 3 Delivery Manager - Manager Construction
Desigan Naicker	Unit 4 Delivery Manager - Manager Projects
Zolisa Mametja	Unit 5 Delivery Manager - Middle Manager Contracts
Vukile Dweba	Unit 6 Delivery Manager - Manager Construction
Mandla Nhlengethwa	BMH Delivery Manager - Middle Manager Capital Ex
Cobus Prinsloo	BOP Delivery Manager – Middle Manager Project Manager
Portia Matshitela	Middle Manager Quality Assurance
Harold Malebe	Manager Auditing (Governance)
Tebatjo Mapulane	Manager Document & Record Management

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Tumiso Railo	Middle Manager Project Engineering
Frans Durand	Middle Manager Safety & Risk

5. Revisions

Issue	Date	Rev.	Compiler	Remarks
First Issue	19 December 2019	1	J Mamashela	N/A
Second Issue	18 June 2021	2	J Mamashela	N/A

6. Development Team

Name	Position
Desigan Naicker	Unit 2 Delivery Manager - Manager Projects
Vukile Dweba	Unit 3 Delivery Manager - Manager Construction
Desigan Naicker	Unit 4 Delivery Manager – Manager Projects
Zolisa Mametja	Unit 5 Delivery Manager - Middle Manager Contracts
Vukile Dweba	Unit 6 Delivery Manager - Manager Construction
Mandla Nhlengethwa	BMH Delivery Manager - Middle Manager Capital Ex
Cobus Prinsloo	BOP Delivery Manager – Middle Manager Project Manager
Portia Matshitela	Middle Manager Quality Assurance
Harold Malebe	Manager Auditing (Governance)
Tebatjo Mapulane	Manager Document & Record Management
Tumiso Railo	Middle Manager Project Engineering
Frans Durand	Middle Manager Safety & Risk

7. Acknowledgements

All the participants are acknowledged

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8. Appendix

Refer to the latest revision of the documents stated below

- Appendix A Weekly Report (240-152243771)
- Appendix B GC OMAC Report

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