

	Work Instruction	Kusile
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Change Management
Work Instruction**

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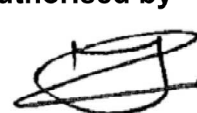
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1. INTRODUCTION

Changes occur throughout the project lifecycle due to numerous reasons which necessitates engineering changes to an established engineering baseline. These changes may be due to: re-design, plant optimisations, interferences, constructability, commissioning issues, etc. Such changes will usually affect the engineering baseline, it is therefore crucial to ensure that these changes are managed in a formal process to guarantee effective and traceable changes to the engineering baseline. The aim of this change process is to ensure that the design integrity of Kusile and that the design baseline is maintained. This procedure provides a framework for the management of all engineering changes that impacts the design baseline, especially the ones occurring during the design, construction and commissioning stages of the Kusile Project.

2. SUPPORTING CLAUSES

2.1 SCOPE

2.1.1 Purpose

The purpose of this procedure is to define and outline the process that must be followed to ensure that a structured approach is applied for any engineering change to an approved design baseline during the construction of the plant.

2.1.2 Applicability

This procedure applies to all employees including Group Technology, Group Capital, Contractors, Consultants and seconded personnel performing engineering or engineering related work to the Kusile Project

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] 240-53114190, Internal Audit Procedure
- [2] 240-53114026, Project Engineering Change Management Procedure
- [3] 146838.21.0000, Project Instruction Manual

2.2.2 Informative

- [4] 240-53113685, Design Review Procedure
- [5] AB-Z-Z-AN001, Project Bravo User Requirement Specification
- [6] 240-124499452, Kusile Project Documents Management Work Instruction
- [7] 240-124499000, Kusile Project Records Control Work Instruction

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- [8] 240-125815990, Commissioning and Completion of Kusile Power Station Work Instruction
- [9] ISO 9000:2015, Quality Management System - Fundamentals and Vocabulary
- [10] ISO 9001:2015, Quality Management System – Requirements
- [11] 240-131634789, Project Quality Plan

2.3 DEFINITIONS

Definition	Description
Assessment	Activity undertaken to determine the suitability, adequacy and effectiveness of the subject matter to achieve established objectives.
Baseline	A specification or product that has been formally reviewed and agreed upon, placed under configuration control and documentation management, and that thereafter serves as the basis for further development.
Change Meeting	The Change Review Panel meeting at Kusile Site where proposed changes are reviewed.
Change Review Panel	A standing panel consisting of LDEs representing all engineering disciplines involved in the Project. The review panel members shall review the proposed engineering changes, analyze the impact assessment results and debate the feasibility of the proposed change. The review panel shall be formed by the Engineering Design Work Lead as per engineering change classification.
Design Base	The Design Base of an Asset is the combination of those key design outputs that define the functions, capabilities, capacities, physical sizes and dimensions (Physical Base), limits and set points, shutdown and start-up sequences, normal and out of normal operations (Operating Technical Specification) and maintenance elements (Maintenance Base), that are required for the asset to meet its required performance, reliability and availability within the limits of the external constraints.
Engineering	Eskom Engineering, as represented within the project by Kusile Project Engineering.

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Definition	Description
Engineering Change Notice (ECN)	The outcome from the ECN Process used by the DA to issue a proposed revision to an approved document. An ECN contains the reasoning for the changes required as well as the impact of the proposed changes.
Engineering Response	Formal communications that does not require a change in design documentation. Generally in response to CIR
Field Change Notice (FCN)	The outcome of the FCN Process is used during construction and commissioning to mark up the design documentation, typically by means of red marks on to documentation, to reflect the proposed changes that are required.
Life Cycle Status	The status provided to an engineering document indicating the intended use as determined by the DA, e.g. Final, preliminary, as built, issued for construction, issued for detail design.

2.3.1 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

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2.4 ABBREVIATIONS

Abbreviation	Description
BOP	Balance of Plant
CM	Configuration Management
CIM	Communication Interface Manual
CM	Contracts Manager
DA	Design Authority
DMO	Documentation Management Office
ECM	Engineering Change Management
ECN	Engineering Change Notice
ECP	Engineering Change Proposal
ECSA	Engineering Council of South Africa
EDWL	Engineering Design Work Lead
ESKOM	ESKOM Holding SOC
FCN	Field Change Notice
FIDIC	Fédération Internationale Des Ingénieurs-Conseils
HO	Head Office
LDE	Lead Discipline Engineer.
NCR	None Conformance Report
PDM	Project Design Manual
PIM	Project Instruction Manual
RFD	Request for Design
CIR	Contractor Information Request
SPO	SmartPlant Operator
URS	User Requirement Specification
KET	Kusile Execution Team
DRM	Documentation and Records Management
PEM	Project Engineering Manager

2.5 ROLES AND RESPONSIBILITIES

Te	Definition
Contractor	The contractor executing the design during the construction and commissioning process.
Contract Manager/Engineer	Contract Manager(CM)/Engineer shall be responsible for: - Ensuring that this procedure is adhered to - Executing their responsibilities and powers as delegated on the FIDIC contractual relationship.

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Design Authority (DA)	The DA shall be responsible for • Establishing the design requirements and ensuring that the design output documents accurately reflect the design basis. • Design control and ultimate technical adequacy of the design process. Important to note that the professional accountability can either rest with: 1. Eskom, when acting as designer (Eskom the DA) or; 2. The external design office who works according to their own internal design processes. In both these instances, the DA remains responsible and accountable for the correctness of the design documents, irrespective of whether these documents have been reviewed by Eskom or not.
DA's representative	The DA representative shall be responsible for • Acting on behalf of the DA • Considering proposals and changes on behalf of the DA • Formalizing approved change by means of an Engineering Response, Field Change Notice or Engineering Notice.
Engineering Design Work Lead (EDWL)	An ECSA professionally registered person who has been appointed and delegated responsibility to manage design related activities on the Project and to coordinate the design work performed by Lead Discipline Engineer Roles. He/she co-ordinates the design work provided by the discipline Design Engineering roles and integrates this work into a final integrated design product. He/she is the custodian of the requirements set and the interface register between packages and part of his/her role is to maintain this information. He remains responsible for the integrity of the engineering product and is accountable for the overall management of interfaces and delivery of an integrated product.
Documentation and Records Management	Register all engineering change documentation and distribute engineering change paper work through a transmittal process.

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2.6 PROCESS FOR MONITORING

Monitoring will be based on the Internal Audit Procedure [1], Quality Management System Manual and Self Assessments.

2.7 RELATED/SUPPORTING DOCUMENTS

- Design Change Notice Template
- Engineering Impact Assessment

3. KUSILE ENGINEERING CHANGE MANAGEMENT PROCEDURE

3.1 ENGINEERING CHANGE MANAGEMENT LIFE CYCLE

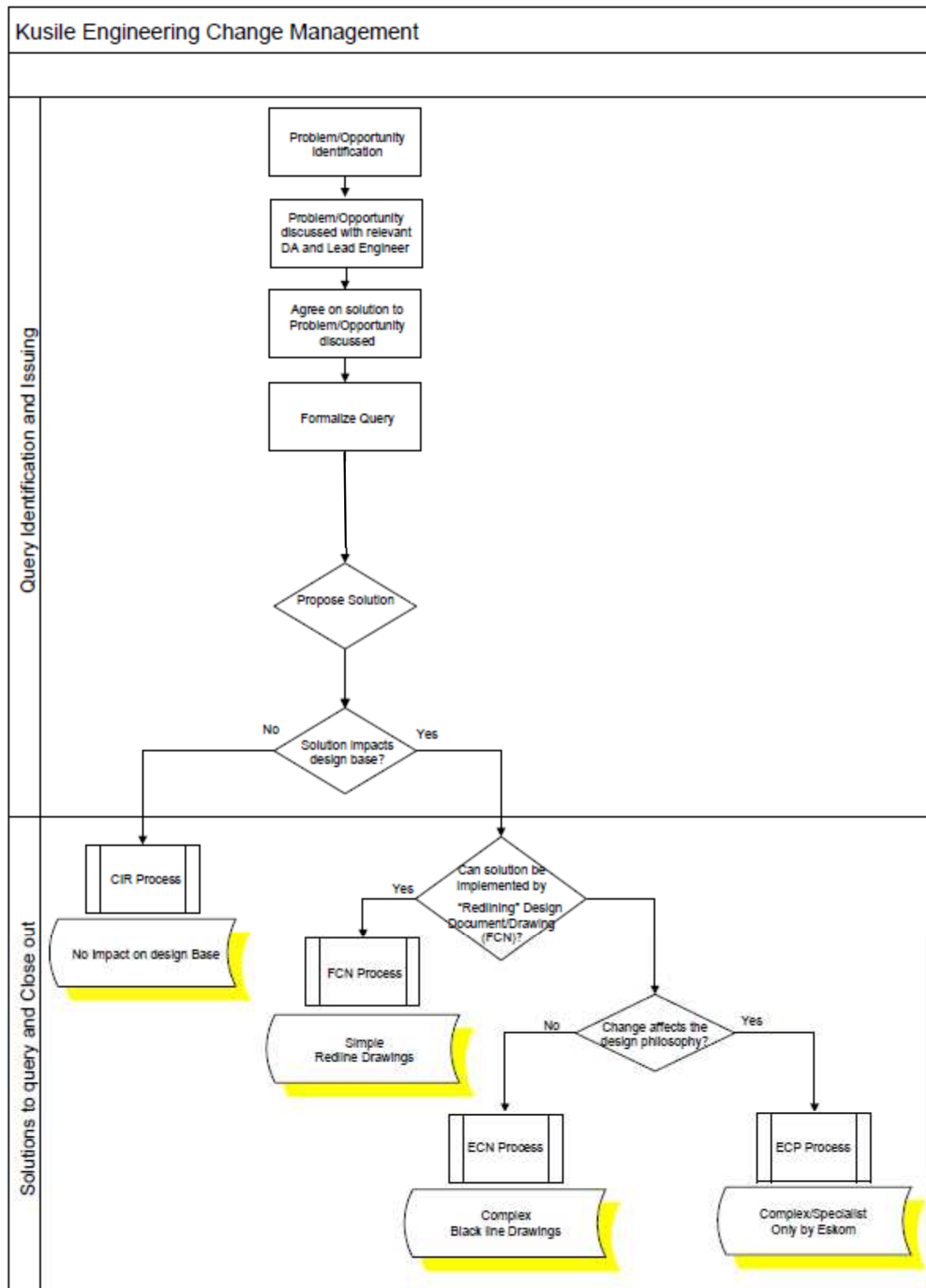
The phases within the engineering change management lifecycle shall be divided as indicated in Figure 1. The phases are:

- Query Identification
- Issuing Phase
- Resolution
- Close-out Phase

The processes in each phase shall be used to manage and control technical queries and engineering changes that affect the integrity of the design baseline from any DA.

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**Figure 1: Kusile Engineering Change Management****CONTROLLED DISCLOSURE**

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3.2 QUERY IDENTIFICATION AND ISSUING

All technical queries, whether identified through experiencing a problem or identifying an opportunity, will have consequences. Figure 1 outlines the process that shall be followed depending on the type of queries that has been identified. As indicated in Figure 1, all technical queries must be discussed by the Originator, Lead Project Engineer together with the DA Representative and a resolution on the way forward should be discussed before the query is formalised. The purpose of this discussion is to ensure the following:

- The problem or opportunity is correctly identified
- Possible solutions are discussed
- Decide whether this should be taken further for resolution or not.

The resolution shall be an agreed problem statement with the way forward on how to issue will be addressed.

If the problem was not resolved and clarified during the discussion, the Originator shall formally submit a Contractor Information Request (CIR). All CIR's shall be formally submitted to Eskom following the CIR Process.

3.3 CIR PROCESS

The CIR process provides a formal way in which all technical queries shall be raised to the relevant individuals for resolution. All technical queries that have been discussed and properly identified shall be populated and issued to all applicable parties as per the CIM using the correct Template. The CIR process is outlined in Figure 2.

Contractor Information Requests (CIR's) are used to communicate a range of items. The CIR process is outlined in Section 5 of the PIM [3]0. CIR's are most commonly used in the following situations:

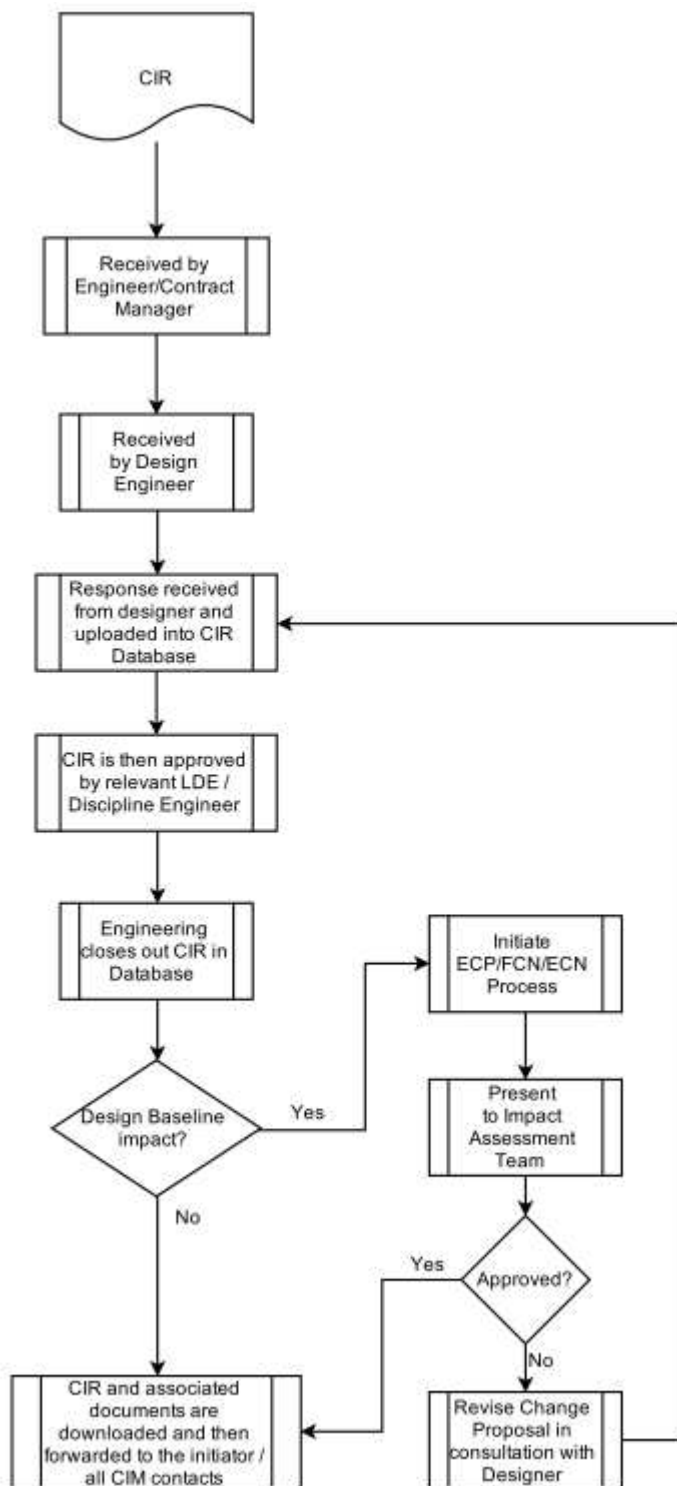
- The Contractor requests "clarifications" to unclear or conflicting designs.
- The Contractor requests substitutions or deviations based on existing conditions or work preference.
- In some instances change are initiated via a CIR.

The Eskom Site Engineer has the authority to initiate a CIR should there be a need for a clarification/change. In such cases the field engineer prompts the Contractor for a CIR.

Each CIR is routed to the designer of the item/area, the designer then responds to the request with an acceptable solution. In cases where the designer is not part of the Kusile Execution team (KET), both the CIR and the designer response is first reviewed and approved by the appropriate KET Engineer.

Where the request is deemed valid, the CIR shall be accepted. Accepting the CIR does not mean that it shall be subsequently approved, it is an indication that it is sufficiently justified to be given further consideration.

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**Figure 2: CIR Process****CONTROLLED DISCLOSURE**

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Once a CIR is received from the change coordinator, it will be evaluated by the Project Engineer/Lead Discipline Engineer. The Project Engineer shall determine whether the request is clear and unambiguous before progressing. The CIR is then sent through to relevant design authority [DA] to determine if the change is technically acceptable or to provide clarity on unclear or conflicting designs. Once the CIR is vetted by the relevant design authority the response is uploaded into the CIR database. The Lead discipline engineer or applicable system engineer is then informed of the CIR for approval.

All requests that impact engineering but do not affect the design baseline shall also be dealt with using only the CIR process. Once the CIR has been approved within the CIR database, it is closed out by engineering.

For all other valid technical requests that impact engineering and affect the baseline, the change coordinator (responsible engineer) shall initiate an FCN/ECN or ECP as applicable. This change is registered and captured on the project change register, the responsible engineer on the system or package performs a high-level assessment of the request to ensure the completeness of the request as a potential change to the project. All changes shall be validated by the relevant lead engineer. Field changes that are not justified as complete change requests shall be deemed as invalid and these Project Change Requests shall be closed out and the engineering change requestor notified accordingly.

Once the CIR is closed out and the FCN/ECN or ECP approved [if applicable] the document is then communicated to the change initiator as well as all other parties listed within the package CIM.

All CIR's that are not accepted shall be rejected and a notification shall be sent to the change coordinator to close out the change. All accepted CIR's will be captured within the CIR database.

3.4 ENGINEERING CHANGE RESPONSE PROCESSES

As shown in Figure 1, all responses that affect the design base shall be executed using the response types listed below, and these are further discussed in the sections that follow.

- Field Change Notice (FCN)
- Engineering Change Notice (ECN)
- Engineering Change Proposal (ECP)

The DA has the responsibility to produce designs of a high standard and should be error free. If the DA becomes aware of any errors (including lack of information), the DA shall corrects these errors using the applicable Engineering Change Management processes. A guideline to be used when selecting the correct Engineering Change Management process is listed below.

Table 1: Engineering Change Selection Criterion

Process	Summary	Complexity	Drawings Type
CIR	Used to respond to queries that does not affect design baseline	Dependent on the clarification/change identified.	-

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FCN	Used to markup changes to design documentation. Typically used during construction and commissioning to “redline” design documentation in order to reflect changes.	Simple	Redline Drawings
ECN	Used for the revision of frozen design documentation. Typically used to reflect the “as built” or “as commissioned” state using the FCN’s and marked up documentation from the field.	Complex work	Black line Drawings
ECP	ECP’s are initiated by employer and not DA. Typically used for missing scope, alignment of URS, or alternative design concepts.	Complex and Specialist work	Black Line Drawings

3.5 FIELD CHANGE NOTICE PROCESS

Using the guidelines shown in Engineering Change Selection Criterion the Impact Assessment Team shall assess whether an FCN can be used for responding to the CIR/Change request. When discussing the CIR/Change request and agreeing on a resolution, an FCN process as outlined in Appendix A can be used to respond to the CIR/Change request, provided the resolution falls within the set criteria listed in Table 1.

After the Impact Assessment Team has discussed and agreed that the resolution to a CIR/Change request shall be addressed using an FCN, the CIR/Change request shall be formally submitted to the DA.

Upon receiving the formal CIR/Change request, the DA (or representative) shall produce the required response on the FCN template [3], outlining the problem, solution as well as the expected impact on the design and construction. The DA shall identify the design documents affected and mark up the changes using the latest authorised documentation. Before submitting the FCN to Engineering for review, the DA shall also classify the FCN in terms of:

- Design Document Error or Omission – The DA erred during the design process and requires a correction to the approved design in order to make it functional and/or safe.
- Value Engineering – Although the current design is fully functional and safe, by performing a change to the design as proposed, certain saving in time and/or costs may be achieved that will exceed the additional design costs and time incurred.
- Design Improvement – Although the current design is fully functional and safe, in the professional opinion of the DA Representative a change is required in order to cater for specific conditions not envisaged as part of the original design.
- Workaround – A temporary physical plant, equipment or component, etc. Or electronic attributes (setting, logic, etc.) that is fulfilling the function of the part, or whole of the design during the

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commissioning stages of the project, but is not intended to be handed over as part of the final design, thus the workaround will be decommissioned and removed before handover.

- Construction Integration – During the construction of the design it is found that certain changes must be made in order make the overall (cross package/cross designer) design functional and/or safe.
- NCR Incorporation – A concession is evaluated and incorporated into the overall design, changing the design base, and making the construction compliant. If the construction concession acceptance is for a specific component only, without changing the design base, the drawings are not updated and the concession is reflected on the quality records only.

All completed FCN's shall be formally submitted back to CM/Engineer and DMO. All FCN's shall be processed by DMO. All FCN's shall be registered, loaded to SPO and distributed to the relevant CM and Engineering disciplines for review and final approval. The relevant Lead Project Engineer for the Query Originator shall review the marked up documentation as well as the FCN descriptions and classification, and involves other parties.

The Impact Assessment Team Leader shall lead and complete the impact assessment using the correct template [5] before submitting the FCN to the Change Meeting for final review. The Change Meeting reviews the FCN to ensure that the correct party reviewed the response and that the impacts assessed are acceptable before authorising the response by confirming that it does not impact on the overall integration of the plant. Only the Project Engineering Manager or EDWL can authorise the FCN.

All approved FCN's shall be formally communicated to both the DA and the Query Originator through their respective CM's. However, if an FCN has been rejected the response shall only be communicated to the DA for correction and resubmission. The Query Originator shall, upon receipt of the FCN, execute the response immediately.

For approved FCN, the DA shall automatically incorporate the redlined changes and update the design documentation. All incorporated changes and updates to design documentation shall be review by Engineering using the normal review process. For FCN that are not approved, the DA shall consider the comments provided by engineering when resubmitting another response.

3.5.1 Emergency FCN/FCN during Commissioning

Changes that are captured on redlined drawings that has been agreed to by the DA or the DA's site representative, either by signature on the drawing or the accompanying (Eskom generated) FCN, can be tabled directly to the change meeting for approval. Where approval is urgently required (e.g. for safety clearance, after hours or over weekends), approval can be obtained from a delegated approver ahead of the change meeting and the FCN approval recorded during the next change meeting.

Such FCNs will be loaded on SPO and linked to the current revision of affected drawings. The FCN will be transmitted to the DA to produce black line updates of affected drawings. It remains the responsibility of the Lead Project Engineer to ensure that the design change has been reviewed and accepted by impacted disciplines, such approval recorded on accompanying impact assessment. Refer to Appendix A for the Engineering Change Management flow diagram.

3.6 ENGINEERING CHANGE NOTICE

ECN's are triggered when an FCN cannot be used to respond to a CIR/Change request or when a revision to an accepted document is made without a pre-approved engineering change. The Engineering Change Selection Criterion outlines the guidelines on when to use an ECN to respond to CIR/Change

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request. After the Impact Assessment Team has discussed and agreed that the resolution to a CIR/Change request may be addressed using an ECN, the CIR/Change request shall be formally submitted to the DA. Refer to Appendix B for the ECN Process.

ECN's shall be completed using the correct ECN template, correctly identifying and revising all the design documents and clearly indicating the changes in the revision blocks. ECN's should clearly state the problem, solution as well as the expected impacts on the design, construction and commissioning.

Before submitting the ECN to Engineering for review, the DA shall also classify the ECN in terms of:

- Design Document Error or Omission – The DA erred during the design process and requires a correction to the approved design in order to make it functional and/or safe.
- Value Engineering – Although the current design is fully functional and safe, by performing a change to the design as proposed, certain saving in time and/or costs may be achieved that will exceed the additional design costs and time incurred.
- Design Improvement – Although the current design is fully functional and safe, in the professional opinion of the DA Representative a change is required in order to cater for specific conditions not envisaged as part of the original design.
- Workaround – A temporary physical plant, equipment or component, etc. Or electronic attributes (setting, logic, etc.) that is fulfilling the function of the part, or whole of the design during the commissioning stages of the project, but is not intended to be handed over as part of the final design, thus the workaround will be decommissioned and removed before handover.
- Construction Integration – During the construction of the design it is found that certain changes must be made in order make the overall (cross package) design functional and/or safe.
- NCR Incorporation – A concession is evaluated and incorporated into the overall design, changing the design base, and making the construction compliant. If the construction concession acceptance is for a specific component only, without changing the design base, the drawings are not updated and the concession is reflected on the quality records only.

All completed ECN's shall be formally submitted back to CM/Engineer and DMO for processing. ECN's shall be registered, loaded to SPO and distributed to the relevant CM and Engineering Disciplines for review and final approval. The relevant Lead Project Engineer shall review the updated design documents as well as the ECN descriptions and classification, and involve affected parties.

The Impact Assessment Team Leader shall lead and complete the impact assessment using the correct template [5] before submitting the ECN to the Change Meeting for final review. The Change Review Panel shall review the ECN to ensure that the correct parties reviewed the response and that the impact assessed is acceptable before authorising the ECN. Only the Project Engineering Manager or EDWL can authorise the ECN.

All approved ECN's shall be transmitted to both the DA and the Query Originator through their respective CM's. However, if an ECN has been rejected the response shall only be communicated to the DA for correction and resubmission. The Query Originator shall, upon receipt of the ECN, implement the notice immediately. Refer to Appendix B for the Engineering Change Management flow diagram.

3.7 ECP PROCESS

Refer to the Project Engineering Change Management Procedure [2] for ECP process.

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3.8 ENGINEERING CHANGES BEFORE AND AFTER PROJECT HANDOVER

The following principles will be implemented in order to ensure clear accountability for the completion of the Kusile project before and after handover:

Before Project Handover

The authority for approval and implementation of changes for all plant, before handover to Generation (Gx) will be the Kusile Project using the Project Engineering Change Management (PECM) Process. All changes will be considered by the KET Change Committee for approval.

The representative of Gx i.e. Power Station Engineering Manager must be informed of all changes that are implemented on plant already in CO.

After Project Handover

Where any stakeholder identifies and request changes on plant after CO/Handover, such changes shall be recorded by Generation on SAP Engineering Change Management (ECM) system and considered by the Gx Kusile Site Change Control Committee (SCCC) for approval, after which, if it is deemed a design deficiency, the request will be submitted to the Kusile Project.

The representative of KET i.e. LDE/EDWL must be informed of all changes that are implemented on plant already in CO.

All design deficiency requests will be reviewed by the LDE/EDWL for consideration. Typically changes that relate to defects, contractual obligations, lessons learnt to be transferred to remaining units, optimisation (outside set boundaries) etc. will be implemented through the PECM process. All new requests/designs/defects or changes etc. will be managed/implemented through the ECM process.

To provide clarity, a memorandum has been developed to detail the process flow refer to 0.

3.9 CONFIGURATION MANAGEMENT

If the DA was requested to update design documentation based on an approved CIR, FCN, or ECP or to incorporate design review comments, the DA shall clearly indicate the reference number of the previously approved change for that specific revision on the transmittal note. These documents shall be reviewed using the standard SPO workflow review process. If the DA deviates from the pre-approved change the ECN process must be followed.

The Configuration Management team shall at all times, maintain a Register of all CIR, FCN, ECN and ECP. This register shall track the progress of all the CIR, FCN, ECN and ECP as well as ensuring the timely close out of all CIR, FCN, ECN and ECP. The register shall clearly indicate the following information;

1. SPO No.
2. Doc. Number
3. Title
4. Date Registered
5. Compiler Name
6. Package Unit / Level
7. Design Change Type
8. Proposed Change Classification

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- 9. Affected Drawings
- 10. Impact Assessment
- 11. Date Presented

The CIR/Change Request status shall be indicated as follows

- Open: Un-answered
- Open: Date provided for resolution
- Closed: Query resolved

The following time frames shall be applied and used as targets for the relevant processes by the configuration team

- FCN – within 7 days following CIR/Change Request approval
- ECN – within 30 days following FCN or ECP approval
- ECP – within 30 days of problem identification

The Lead Project Engineer together with the Impact Assessment Team Leader shall review the, FCN, ECN and ECP before making any recommendations to the Change Meeting. All, FCN, ECN and ECP's shall be submitted to the Change Meeting for final review and authorisation. When making a status recommendation to the EDWL, the Lead Project Engineer together with the Impact Assessment Team must provide assurance of the following:

- All documents affected by the CHANGE have been comprehensively reviewed.
- The referred documents should all have the Review Statuses as recommended.
- All the necessary comments have been captured.

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4. AUTHORISATION

This document has been seen and accepted by:

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Shamita Jagjiwan	Kusile System Integration Lead
Sadesh Ramdial	Chief Engineer - Integration
Makwena Makgwane	Document and Records Management Manager

5. REVISIONS

Date	Rev.	Compiler	Remarks
November 2017	1	S Jagjiwan	Supersedes 203-79326

6. DEVELOPMENT TEAM

The following people were involved in the development of this document:

- Yuvir Gokul
- Sadesh Ramdial
- Shamita Jagjiwan
- Andell Kannemeyer

7. ACKNOWLEDGEMENTS

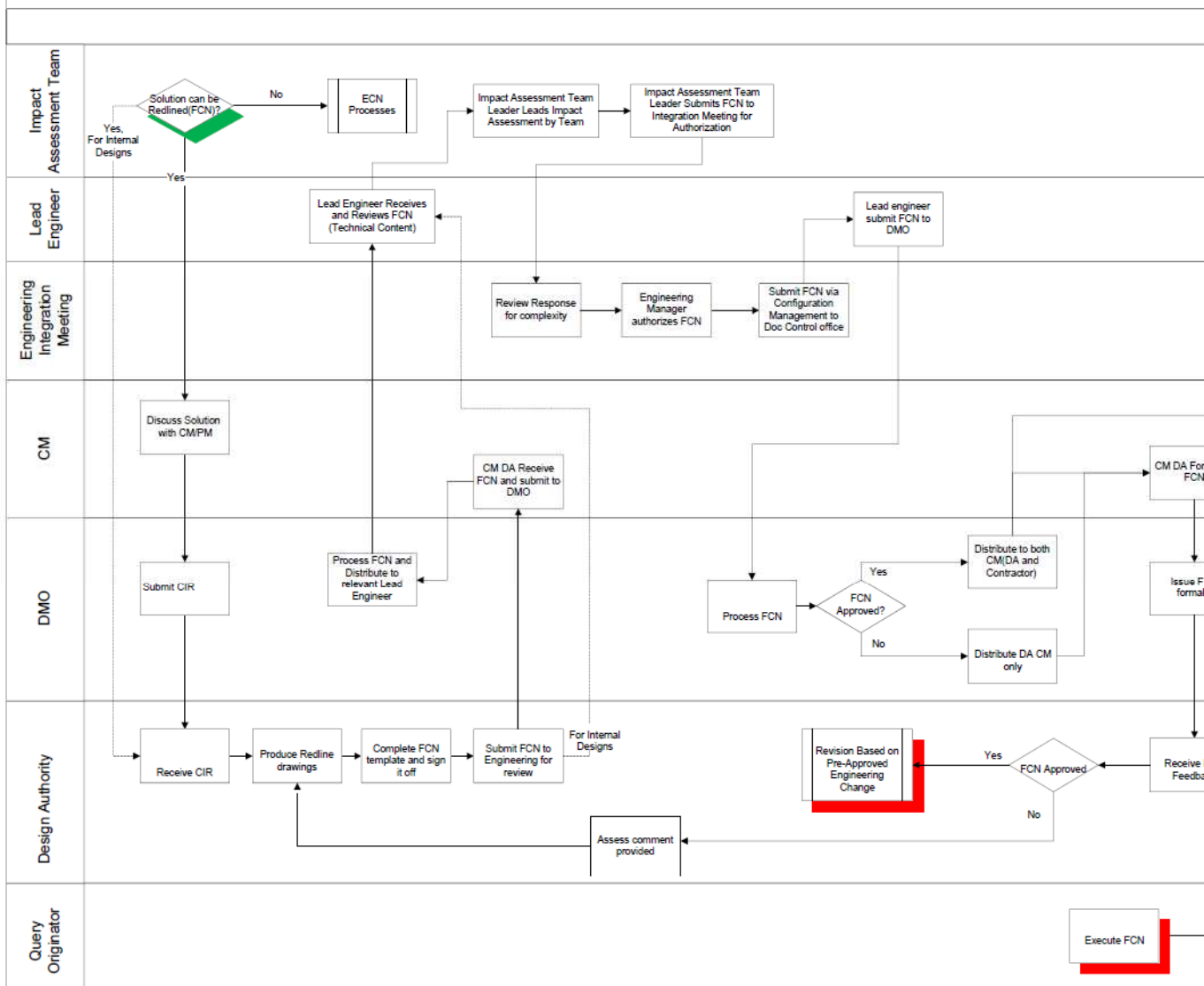
- Medupi Engineering Team

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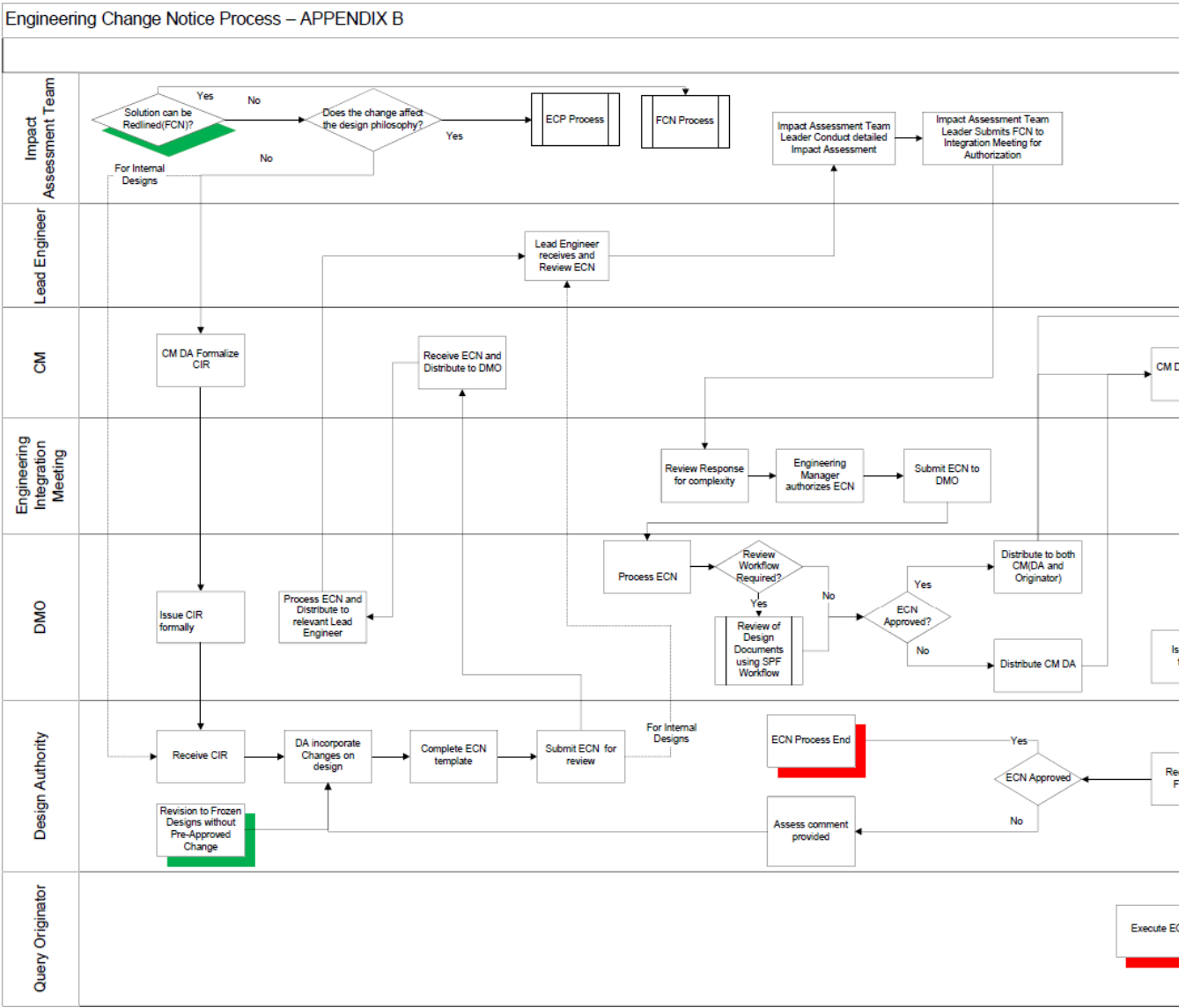
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APPENDIX A: FCN FLOW DIAGRAM

Field Change Notice Process – APPENDIX A



APPENDIX B: ECN FLOW DIAGRAM



APPENDIX C: ENG. CHANGES BEFORE AND AFTER PROJECT HANDOVER

To:	Ntebogeng Mhlungu
From:	Tumiso Railo
Copy:	Yuvir Gokul; Shamita Jagjiwan; Joseph Ngqendesha
Date:	2017/10/26
Ref:	240-53114002 - Engineering Change Management Procedure 240-53114026 - Project Engineering Change Management Procedure 203-79326 - Kusile Engineering Change Management Work Instruction 240-72343609 - Engineering Issue Management and Escalation Work Instruction
Subject:	KUSILE POWER STATION PROJECT ENGINEERING CHANGES BEFORE AND AFTER PROJECT HANDOVER

The purpose of this document is to clarify the process for the management of Engineering Changes at the Kusile Power Station Project before and after Project Handover. The following definitions must be noted:

Term	Definition
Handover	The process of taking-over the responsibility for all, or part of the project, or its deliverables from the KET and transferring it to Generation. It is also the transfer of the statutory accountability of the plant and equipment and includes all relevant documentation required to operate and maintain the plant.
Before Handover	Statutory accountability of the plant and equipment and all relevant documentation required to operate and maintain the plant resides with KET engineering.
After Handover	Process of transfer the responsibility for all, or part of a project, or its deliverables from the KET Contractor to the KET Construction Manager before handing it over to the Generation Engineering (i.e. certified completion). Statutory accountability of the plant and equipment and all relevant documentation required to operate and maintain the plant resides with Gx engineering.

The following principles will be implemented in order to ensure clear accountability for the completion of the Kusile project before and after handover:

1. Before Project Handover

- The authority for approval and implementation of changes for all plant, before handover to Generation (Gx) will be the Kusile Project using the Project Engineering Change Management (PECM) Process. All changes will be considered by the KET Change Committee for approval.
- The representative of Gx i.e. Power Station Engineering Manager must be informed of all changes that are implemented on plant already in CO.

2. After Project Handover

- Where any stakeholder identifies and request changes on plant after CO/Handover, such changes shall be recorded by Generation on SAP Engineering Change Management (ECM) system and considered by the Gx Kusile Site Change Control Committee (SCCC) for approval, after which, if it is deemed a design deficiency, the request will be submitted to the Kusile Project.
- The representative of KET i.e. LDE/EDWL must be informed of all changes that are implemented on plant already in CO.
- All design deficiency requests will be reviewed by the LDE/EDWL for consideration. Typically changes that relate to defects, contractual obligations, lessons learnt to be transferred to remaining units, optimisation (outside set boundaries) etc. will be implemented through the PECM process. All new requests/designs/defects or changes etc. will be managed/implemented through the ECM process.

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ENGINEERING CHANGES BEFORE AND AFTER PROJECT HANDOVER

To provide clarity the following is a summary of the recommended steps that should be followed:

- a. An Engineering Change Notification (ECN) will need to be raised
- b. The Change Coordinator (CC) routes the change to the relevant Gx System Engineer (SE)
- c. He/she will need to evaluate the change by performing a Root Cause Analysis/ Investigation/Assessment of the change. The evaluation will be completed by Gx to determine whether the change is warranted, the KET relevant engineer must form part the evaluation.
- d. If the evaluation deems the change as a design deficiency, the relevant LDE/EDWL will need to determine the applicability to the project.
 - If the change is supported by the KET relevant engineer LDE/EDWL within Project Engineering:
 - The execution route for the changes under the above conditions, recommended to the SCCC, will be the PECM process.
 - If the change is not supported by the KET relevant engineer/LDE/EDWL within Project Engineering:
 - The Gx System Engineer will arrange a meeting with all stakeholders (Gx and KET) including Engineering managers (which shall be called a deciding committee);
 - If this committee agrees i.e. change is not supported then the execution route for the changes under the above conditions, recommended to the SCCC, will be the ECM process.
 - Should there be no resolution (dispute) by the deciding committee, the Gx System Engineer, the relevant stakeholders will escalate to the Gx and Project Engineering management. Thereafter, if there is still no resolution it will be escalated through the process defined in the Engineering Issue Management and Escalation Work Instruction.
- e. The SCCC will review the evaluation and select the applicable execution route for the project based on the recommendations. This decision/execution route must be supported by both projects and Gx in order for the project to proceed
- f. An ECR will then be created once the SCCC has approved the ECR.

Where the execution route is via PECM, the interface between the ECM and PECM process is shown in the figure 1 below.

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KUSILE POWER STATION PROJECT ENGINEERING CHANGES BEFORE AND AFTER PROJECT HANDOVER

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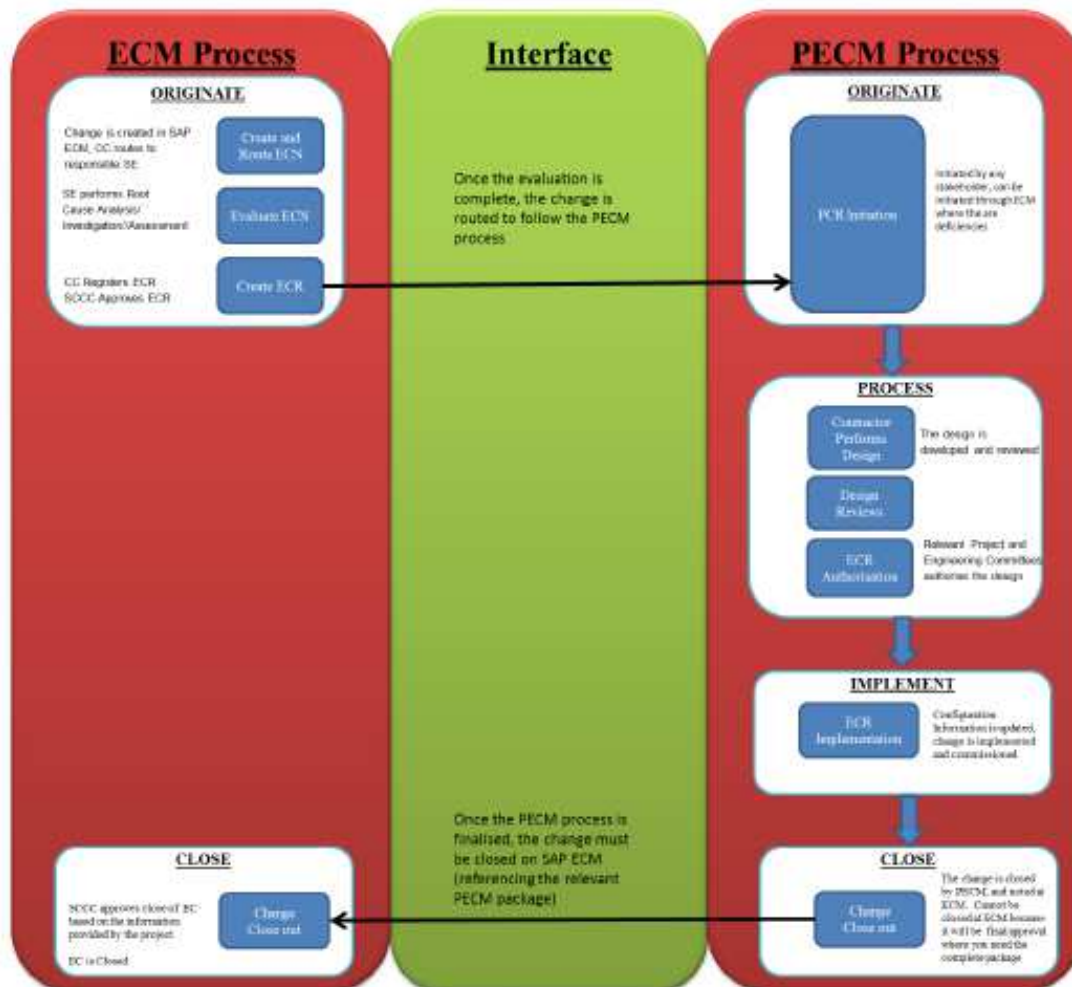


Figure 1 – Interface between the ECM and PECM Process

Should the change be supported, the interface between the ECM and PECM is detailed as follows:

- The Gx Change Coordinator (CC) will inform the PECM administrator to initiate the PECM process.
- These requests will be registered and managed via the PECM process for consideration and implementation.
- The change request will be closed out via the PECM process upon completion.
- The PECM administrator will advise the CC formally when the change has been closed.
- The close out of the change is noted in the ECM process and the SCCC then approves close of the change. (Full package is stored as part of the PECM and referenced in ECM)

It must also be noted that:

- Operators should only implement changes requested by the Generation system owner (for plant handed over) and the relevant KET engineer (for plant not handed over).
- Emergency Engineering Changes can be raised by either Gx or KET however Gx engineer will be accountable for the change. A relevant Gx representative will report weekly on all the changes that have occurred (normal and emergency) at the KET Change Committee. The Kusile Project team will review and advise if any emergency changes are required/have been missed.

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**KUSILE POWER STATION PROJECT
ENGINEERING CHANGES BEFORE AND AFTER PROJECT HANDOVER**

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Should further clarity or assistance be required please do not hesitate to contact us. A Work Instruction detailing the process is to follow.

Yours sincerely



15/11/2017

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Tumiso Railo
PROJECT ENGINEERING MANAGER
KUSILE POWER STATION

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Date:

Accepted by:



15/11/2017

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Ntebogeng Mhlungu
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