

Title: **Risk Management procedure for Capital Expansion Projects**

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FUNCTIONAL RESP.

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1 Introduction

This Procedure sets out the mandatory risk management process requirements for all Capital Expansion Projects or departments involved with Capital Expansion Projects, within the Enterprises Division. It also provides the requirements for identifying, recording, monitoring, reviewing and reporting of risk management, which includes threats and opportunity aspects on the Capital Expansion Projects and aims to achieve the following objectives:

- to ensure that management have identified and assessed all project related risks, threats and opportunities, in a consistent and demonstrable way;
- to ensure that management have implemented effective control measures which continue to provide appropriate mitigation or avoidance of risks, or realisation of benefits from opportunities.
- to assure the Integrated Risk Management and Assurance function within Enterprises Division that risks are being appropriately managed throughout the Capital Expansion Program; and
- to ensure that the Capital Expansion Program discharges its obligations in meeting corporate governance standards.

By risk, we mean the uncertainty of something happening that will impact on our objectives. In this, we include positive impacts that can be achieved by exploiting opportunities, as well as negative impacts that might materialise.

This procedure describes the methodology and process to be followed by all groups. Detailed user guides will be issued to clarify application for specialist groups, e.g. Designers, Contract Managers. A user guide will also be issued to clarify Enterprises Divisions high level reporting requirement which will be used from the General Manager level and up.

This Procedure takes into account the Hazard Identification, Risk Evaluation and Risk Control procedure 39-13 and Integrated Risk Management process and reporting standard 39-4. Principles contained in these documents have been applied in the Capital Expansion Project Environment.

2 Supporting Clauses

2.1 Scope

This procedure provides a minimal framework to ensure that risk of all types (cost, program, safety, environment, etc.) is managed and communicated throughout the Capital Expansion Program in a visible and demonstrable way. The framework can be applied in different parts (i.e. Projects or Functions) of the Program and at different management levels. Objectives must be appropriately defined for these different parts and levels of the Program and identification of risk shall link to these objectives. It is intended that teams will be thorough in identifying risks for the purpose of management and reporting for the appropriate part/level of the Capital Expansion Program.

The requirements of this procedure are independent of other risk assessments that may be undertaken, for example, to support significant decisions, comply with legislation/ regulation, or for other Eskom Procedures. However, risks identified through these other processes that have a direct impact on project objectives must also be managed and communicated through this procedure. In addition, this procedure does not affect the need to perform these other risk assessments in accordance with particular requirements. Notable examples of other Eskom Procedures also requiring risk assessments are:

- NPC 39- 4 IRM Process and reporting standard
- NPC 39-13 Process for hazard identification, risk evaluation and Risk control
- NPC 39-20 (Draft) Documentation Management requirement procedure

2.1.1 Purpose

To provide a robust approach to risk management that:

- embeds Eskom Group Risk Management Principles;
- aligns with the principles of the Contract Strategies;
- reflects best practice within the context of optimizing achievement of the Capital Expansion Projects objectives;
- is demonstrable across all areas of the Capital Expansion Projects; and
- recognises that risk management is an integral part of good management and of execution planning.

2.1.2 Applicability

Working knowledge: Integrated Risk Management and Assurance Department
Quality management team

Implementers: General Manager for specific Project groups
CED Project Managers
Project Development Manager
Heads of Functional Disciplines within Projects
Project Risk Managers
Risk Coordinators
Project Support Risk Management Function

This procedure shall apply throughout Enterprises division, where department is managing any aspects of Capital Expansion Projects.

2.2 Normative/Informative References

Parties using this procedure shall apply the most recent edition of the documents listed below:

2.2.1 Normative

- ISO 9001:2000 Quality Management Systems
- 39- 4 NPC - IRM Process and reporting standard
- 39-13 NPC - Process for hazard identification, risk evaluation and Risk control
- 39- 3 SHEQ training Standard
- EST 0001 Definitions of Documents

2.2.2 Informative

- N/A

2.3 Definitions

- **Active / Closed** The risk coordinator may close ('Closed') root causes or risks only if the related impacts could no longer occur. They must not be closed just because all the control measures are in place and all the actions have been completed.
- **Cause** See Root Cause.
- **Consequence** This is the immediate physical or practical event resulting from the Risk event.
- **Control**. This measure will reduce the level of risk. There are two types of control measure:
 - **Preventative Controls**, which reduce the likelihood of a Risk
 - **Reactive Controls**, which reduce the impact of a Risk
- **Discipline Project Managers** is the Sectional, Area or Functional Project Managers, reporting to the Project manager, on a project. For example: Boiler Project Managers, Engineering Manager etc.
- **Live Risk Register** See **Annexure A** consolidation of all the Risk information held by the accountable person plus risks escalated (bottom-up) or cascaded (top-down) to the accountable person.

- **Impact** This is an estimate of the consequence in terms of the effect on key business output variables. See **Annexure B** for scales used on CED Projects. There are two estimates used here:
Inherent Impact is the estimate of the effect of the consequence without allowing for active steps taken to manage it. It assumes a normal environment, rather than one with no controls whatsoever, but it does not take into account the existing active consequence control measures
Residual Impact is the estimate of the effect of the consequence taking into account all existing consequence control measures.
- **Likelihood** This is an estimate of the Likelihood of a Root Cause occurring. See **Annexure C** for scales used on CED Projects. There are two estimates used here:
Inherent Likelihood is the estimate of the likelihood a Root Cause occurring without allowing for active steps taken to manage it. It assumes a normal environment, rather than one with no controls whatsoever, but it does not take into account the existing active cause control measures. (Ask: What is the likelihood of this Root Cause occurring before we put any controls in place)
Residual Likelihood is the estimate of the likelihood of a Root Cause occurring, taking into account all existing Root Cause control measures. (Ask: What is the likelihood of this Root Cause occurring after all possible controls have been put in place)
- **Risk** is anything that is likely to lead to an event that will have an adverse impact on the achievement of an objective or the realisation of benefits for an opportunity. It also takes into account the combination of the impact and likelihood of an unplanned outcome.
The Likelihood scale being used on the CED Projects is shown in **Annexure C**. A list of impact categories and severity scales to be used can be found in **Annexure B**
The numerical values for likelihood and Impact for the Risk can be placed in an importance matrix. These 5x5 risk matrix is shown in **Annexure D**.
- **Risk Register Objectives** The objectives of a particular Risk Register are one or more of the Execution Plan objectives that are pertinent to the Risk Register subject. The objectives of the risk register must be stated carefully and precisely since the nature of the risks, and the expertise needed, will depend directly on them.
- **Risk Review** essentially follows the same process as populating your Risk Register, except that it builds on previous risks Registers, risk reviews and adds news risks to the register. Risk reviews shall be done as specified in the Report and Review Phase 4.
- **Root Cause or Cause.** A root cause is the event or situation that leads directly to the Risk identified. It is fundamental to identify causes since this facilitates identification of suitable control measures. Note: a 'Risk' in the context of one risk assessment might be a 'cause' in the context of another. The management level at which the risks/ causes are defined will depend on the objectives of the risk assessment.

2.4 Abbreviations

- **MD:** Managing Director
- **IRM & A:** Integrated Risk Management and assurance
- **SHEQ:** Safety, Health, Environment and Quality
- **CO:** Client office
- **CED PS:** Capital Expansion Department, Projects Support
- **PDD:** Project Development Department
- **DCO:** Divisional Client Office
- **R & S:** Resources and Strategy
- **PO:** Project Office

- **ENG:** Engineering
- **N/A :** Not applicable
- **PLCM:** Project Lifecycle Model
- **SHE:** Safety, Health and Environment
- **RBS:** Risk Breakdown Structure.
- **PLCM:** Project Life Cycle Model

2.5 Roles and Responsibilities

	NO.	DUTIES	Member in discipline Team	Discipline Project Manager	Project Manager	Risk Manager	Risk Coordinator	Project Support RM	General Manager
Discipline and functional Level	1	Training in Risk Management	P	P	P	A/R	P	R	
	2	Monthly Risk Review and prioritisation of risks on the Discipline Project Management level	P	R	A	C	C	C	
	3	Highlight critical and emerging risks to Discipline PM	R	A	C	C	C		
	4	Completing Risk Mitigation actions allocated to them by Discipline PM	R	A	C	C	C		
	5	Ensuring that the designated processes, procedures and appropriate, 'approved' tools, are operating fully within their teams	P	R/A	I	A	C	C	
	6	Ensure Risk Register is sent to Risk Co-ordinator on monthly basis		R	I	C	C		
	7	Ensuring that all relevant functional specialists, stakeholders, external 3rd parties and other delivery groups are appropriately engaged in both identifying and assessing the adequacy of controls.	P	R/A	C	C		C	
Project Management Level	8	Highlight critical and emerging risks to Project Manager through monthly report and risk register		R	A	C	C		
	9	Monthly Risk Review and prioritisation of risks on the Project Managers Level		P	A	R	C	C	
	10	Implementing Risk Mitigation actions for Risks within the control of the Project (by PM)		C	A/R	C			
	11	Completing Risk Mitigation actions allocated to them by PM		R	A	C	C		
	12	Reviewing Risks after mitigations with PM		C	A	R	C	C	
	13	Ensuring that the designated processes, procedures and appropriate, 'approved' tools, are operating fully within their teams		P	A	R	C	C	
	14	Ensure Risk Register is sent to Project Support Risk Management on monthly basis (via Risk Manager)			A	R		C	
	15	Establish Risk Culture on Project	P	P	A	R	C	C	
	16	Audit Mitigating Strategies	I	P	A	R	C	C/I	
	17	Ensuring comprehensive records are maintained and retained to demonstrate the application of continuous risk management practices that follow the procedure	P	P	P	A	R	I	

	NO.	DUTIES	Member in discipline Team	Discipline Project Manager	Project Manager	Risk Manager	Risk Coordinator	Project Support RIM	General Manager
General Management Level	23	All PMs to highlight critical and emerging risks to General Manager through monthly report and risk register			R	C	C	C	A
	24	PMs to complete Risk Mitigation actions allocated to them by GM		C	R	C			A
	25	Ensuring that the designated processes, procedures and appropriate, 'approved' tools, are operating fully within their teams			P	R		P	A
	26	Ensuring comprehensive records are maintained and retained to demonstrate the application of continuous risk management practices that follow the procedure						I	A/R
	27	Ensure monthly reporting on Top 10 risks to Project Support Risk Management function (User Guide to e issued with ED requirements)			P	P		I	A/R
	28	Ensuring that all relevant functional groups, specialists, stakeholders, external 3rd parties and other delivery groups are appropriately engaged in both identifying and assessing the adequacy of controls.			P	P		P	A/R
Project Support Level	29	The design and delivery of processes, procedures and tools, for Risk Management, to enable the Capital Expansion Program to meet the objectives set			C	C		A/R	
	30	Ensuring that risk managers and coordinators are appropriately trained in the processes, procedures and use of those standard tools that are endorsed and supported by the risk management function				P	P	A/R	
	31	Monitoring and reporting to the MD Enterprises Division, the status of risk management practices across the Capital Expansion Program			C	C		A/R	C
	32	Ensures Projects Risk Registers are received on time			P	P	P	A/R	
	33	Implementing Expert Risk Management Support to Projects			P	C	P	A/R	

(R- Responsible, A- Accountable, C- Consulted, I- Informed and P- Participate.)

Please note:

A dedicated Risk Manager will be appointed for all new build projects and will form part of the project team. Refurbishment, Power Delivery and Return to Service Projects can have a dedicated Risk Manager or a central Risk Manager looking at more than one Project.

2.5.1 Contractors:

- Where Contractors play a key role in achieving ED's Capital Expansion Project objectives, the responsible individual will attend the Risk Review meetings and escalate any Risks which might have a direct impact on the Project objective, to the responsible Discipline Project Manager or Project Manager.

2.5.2 SHE Managers and Officers:

- The SHE Manager will follow this procedure as a Discipline Project Manager and risks identified through other processes, which is safety specific, that have a direct impact on project objectives must also be managed and communicated through this procedure.
- The SHE officers will follow the Procedure which is specified by the SHE Head Office Support function, for daily and task Risk Assessments.
- This procedure is used for management of Project Risks and does not look at the requirements for task and daily safety risk assessments required by the construction regulations.

2.5.3 Head office Support Function:

- This Process is not mandatory for any of the Head office support functions, however they are accountable for ensuring that the risks identified within their Live Risk Registers are appropriately deployed and managed by General Manager and Project Managers if it is applicable to achieving CED's objectives. Head office Support Function includes, Integrated Risk Management and assurance, Quality, Commercial etc. This excludes individuals in the Engineering department whom have a direct link to the Capital Expansion Projects.

2.5.4 The heads of any other groups reporting directly through to the MD Enterprises Division, that are not referenced specifically in 'Accountabilities and approvals', shall be deemed to be 'Head office support function' for the purposes of applying this procedure.

2.6 Implementation Date

The implementation date is from the date of approval.

2.7 Process for monitoring

This document is subject to document control procedures and will be updated when it is due for revision or when conditions dictate.

2.8 Related / Supporting Documents

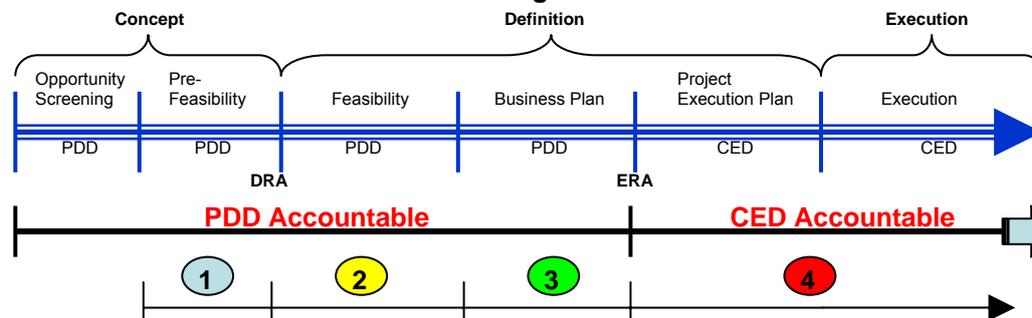
Not applicable.

3 General

3.1 Application through different stages of the PLCM (Project Lifecycle Model)

This Procedure applies to different stages within the PLCM (Figure 1). Frequency of application will depend on the stage of the project. The diagram indicates some of the critical Risk Assessment's which needs to be done throughout the PLCM; this will form part of the live Risk Register for the Project, which will be carried through to the end of the Project. This procedure will be applied throughout the PLCM, in terms of the requirements for identifying, recording, monitoring, reviewing and reporting of Risks.

Figure 1 - PLCM

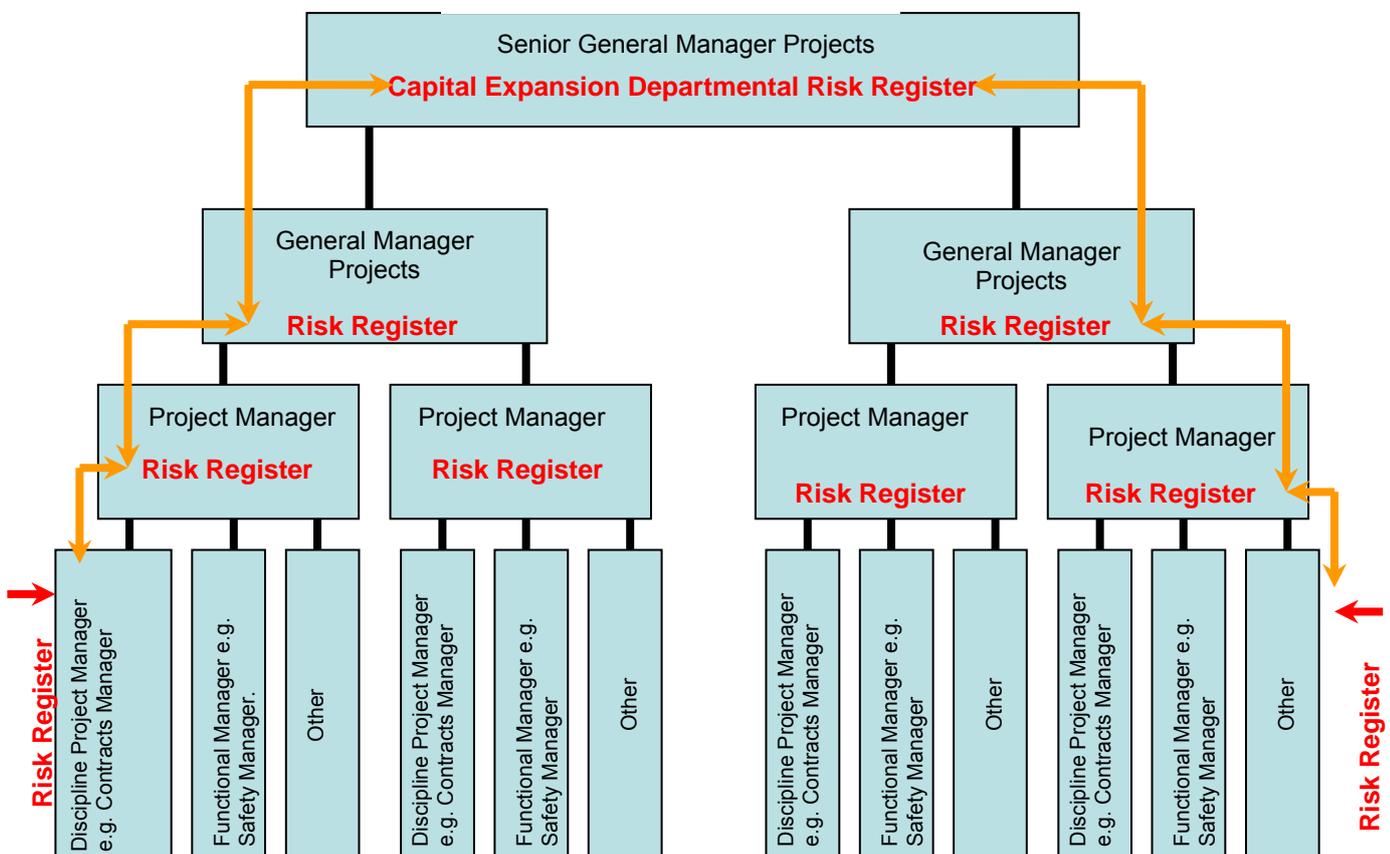


1	<p>PDD is accountable and responsible for undertaking the <i>Risk analysis & Mitigation, Fatal Flaw Analysis</i>. PDD will consult DCO, ENG, R&S and CED Project support during this process. If the decision has been made to take the project to the next stage, the Project Support Risk Management Function will assist in ensuring all Active risks are identified, and carried forward to the next stage of the project.</p>	<table border="1"> <tbody> <tr><td>Accountable</td><td>PDD</td></tr> <tr><td>Responsible</td><td>PDD</td></tr> <tr><td>Consulted</td><td>DCO, ENG, R&S, CED-PS</td></tr> <tr><td>Informed</td><td>N/A</td></tr> </tbody> </table>	Accountable	PDD	Responsible	PDD	Consulted	DCO, ENG, R&S, CED-PS	Informed	N/A
Accountable	PDD									
Responsible	PDD									
Consulted	DCO, ENG, R&S, CED-PS									
Informed	N/A									
2	<p>Project Support Contract Management team, will take Accountability / Responsibility for undertaking the <i>Risk Assessment for the Contract strategy</i> together with the Procurement team, PDD and appointed Project Manager. The Risk Management Function, Project support will facilitate the workshop and make sure active risks are carried through to the next stage of the project.</p>	<table border="1"> <tbody> <tr><td>Accountable</td><td>PDD</td></tr> <tr><td>Responsible</td><td>PO, CED-PS</td></tr> <tr><td>Consulted</td><td>ENG, CO</td></tr> <tr><td>Informed</td><td>DCO</td></tr> </tbody> </table>	Accountable	PDD	Responsible	PO, CED-PS	Consulted	ENG, CO	Informed	DCO
Accountable	PDD									
Responsible	PO, CED-PS									
Consulted	ENG, CO									
Informed	DCO									
3	<p>Engineering takes accountability and shares responsibility with PO and CO, for undertaking the <i>Risk Assessment for the Technical Solutions</i>. The Risk Management Function will assist in ensuring that all identified risks are recorded efficiently and 'active' risks are carried over to the next stage of the project.</p>	<table border="1"> <tbody> <tr><td>Accountable</td><td>PDD</td></tr> <tr><td>Responsible</td><td>ENG, PO, CO</td></tr> <tr><td>Consulted</td><td>DCO, CED-PS</td></tr> <tr><td>Informed</td><td>N/A</td></tr> </tbody> </table>	Accountable	PDD	Responsible	ENG, PO, CO	Consulted	DCO, CED-PS	Informed	N/A
Accountable	PDD									
Responsible	ENG, PO, CO									
Consulted	DCO, CED-PS									
Informed	N/A									
4	<p>CED takes accountability for continuous Risk Management from the <i>Project Execution Plan</i> right through to <i>Close out</i> stage of the PLCM. Risk Management Function, Project Support, will assist in implementing and maintaining Risk Management on Projects as well as giving assurance that it is effectively implemented on Projects.</p>	<table border="1"> <tbody> <tr><td>Accountable</td><td>PO, CED</td></tr> <tr><td>Responsible</td><td>PO, CED-PS</td></tr> <tr><td>Consulted</td><td>ENG</td></tr> <tr><td>Informed</td><td>IRM & A</td></tr> </tbody> </table>	Accountable	PO, CED	Responsible	PO, CED-PS	Consulted	ENG	Informed	IRM & A
Accountable	PO, CED									
Responsible	PO, CED-PS									
Consulted	ENG									
Informed	IRM & A									

3.2 Different levels of application of the Risk Management Process.

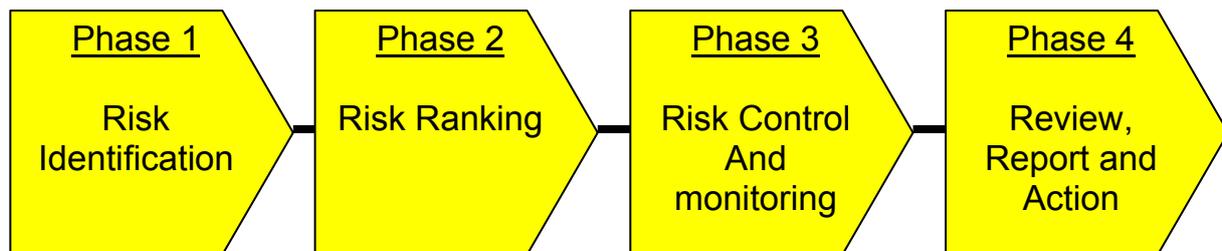
The Risk Management process will follow a line accountability approach, with different levels of Risk Registers feeding into each other. Communication between Risk Registers can be both ways e.g. bottom-up or top-down approach. Due to the fact that the various levels of Management have different objectives, it is important to ensure all levels of risks are effectively managed, in a holistic and integrated approach to Risk Management within the Capital Expansion Project environment. Figure 2 shows an example of the line accountability approach. The arrows in this figure illustrate the interaction between different Risk Registers.

Figure 2
Line Accountability approach



3.3 Risk Management Process

Figure 3



Please Note:

If there is no Risk Coordinator appointed on the Project, all the responsibilities of the Risk Coordinator automatically becomes the responsibilities of the Risk Manager Appointed for the project.

In the event of no Risk Coordinator or Risk Manager on the Project the responsibility will lie with the Project Manager to complete the process and Projects Support Risk Management Function will support in implementing and executing this process.

3.3.1. Phase 1 – Risk Identification

The purpose of a Risk Assessment exercise is to identify the risks inherent in either a scope of work or subject within a functional discipline. A risk is anything that is likely to lead to an event that will have an adverse impact on the achievement of an objective or the realisation of benefits for an opportunity.

Each Risk assessment will start off with the risk identification stage. Risk Identification is the process by which the organization systematically and continually identifies risk, risks and uncertainties and entails the identification of reasonable foreseeable risks.

Risks can be identified using the following techniques (not exhaustive):

- Experience from past activities on a previous project, including risk knowledgebase if available
- Experience from current project, e.g. repetitive work packages, deviation reports, audit results
- Brainstorming in specific / regular / workshop meetings
- Following the Work Breakdown Structure for the Project
- Following the recommended risk breakdown structure **Appendix F**
- Input from the contractors, sub-contractors and suppliers

Based on Identified objectives, conduct each risk identification session with the full involvement of the stakeholders, managers, contractors, specialists, and other parties that play a significant role in achieving the Capital Expansion Program or Project objectives.

Please note: Risk assessment exercise is the process you follow and the outputs of the Risk Assessments are contained in the Live Risk Register.

3.3.1.1 Inputs

1. Capital Expansion Program Objectives.
2. Capital Expansion Project objectives and targets.
3. Execution plans (scope of work statements) / Project Plans

4. Related Functional Execution plans
5. Project Risk Knowledgebase if available
6. Information on changing circumstances affecting risks
7. information on emerging risks

3.3.1.2 Process

2. The team shall be facilitated by a competent person who has undergone formal Risk Identification and Risk Assessment training.
3. The template to be used to record the information, when conducting the risk identification phase is the *Live Risk Register spreadsheet* - attached as **Annexure A**.
(The actual template exists on a Microsoft Excel spreadsheet and when conducting the risk assessment, the information shall be recorded electronically on the Excel spreadsheet. The reason for this is that, when the impact and likelihood scores are entered, automatically the risk ranking column is coloured coded to reflect the ranking of the risk, i.e. green for low risks, yellow for mediums risks and red for high risks. The spreadsheet will be circulated with this procedure.)
Please note: We are in the process of obtaining a Risk Software tool in the near future. When this system is implemented, information capturing will be done via the software tool. Methodology and processes of this Document will stay the same.
4. The objectives of the Risk assessment need to be agreed. The identified objectives will be achieved through executing the scope of work or managing the functional subject. (This information will be entered on the Live Risk Register template)
5. Identify the Risk that could threaten the achievement of each objective (Positive or Negative). Ask 'what could go wrong?'
6. Add a Risk Breakdown category for every risk identified. This is keywords which will assist to look for "hot-spots", where our biggest risk exposures are or as high level prompt lists.
7. Identify 'how could it go wrong' for each risk – the 'root cause' (there are likely to be a number of root causes for each Risk) and the resulting consequence of the risk occurring through each root cause. It is likely that a consequence may result from more than one root cause.
8. Identify person(s) to be accountable for each root cause [the owner(s)']. There may be more than one owner of a root cause when there is both a project delivery and functional involvement in managing a root cause. The root cause ownership will always revert to the person accountable for project delivery in the event that ownership is unclear or disputed. Those Persons identified as root cause owners by others (sitting outside of the project team or functional group) shall include a corresponding/linking item or cross-reference in the owners own Live Risk Register in his project team or functional group.
9. Confirm with each owner that they accept accountability for management of a root cause and associated consequences should the risk materialise as a result of the root cause. Where there is more than one owner of a root cause, agree with each their degree of responsibility.
10. Complete the Risk Register for each objective documenting the outputs from activities 1 through 7.
11. Each root cause shall have a discrete line entry on the Risk Register.

3.3.1.1 People involved

Accountable: (Aligned with their role)	• General Manager for specific Project groups
	• Project Managers for Capital Expansion Projects
	• Project Development Manager for Capital Expansion Projects
	• Heads of Functional Disciplines within Projects
Responsible:	• Project Manager
	• Project Risk Manager & Coordinators
Consulted:	• Functional Leaders (where they are not the accountable person)
	• Contractors (where they play a key role)
Informed:	Project Support Risk Department.

3.3.2 Phase 2 – Risk Ranking phase

Risk Analysis and Risk Quantification/ ranking allow the project team to assess the Impact and Likelihood of risk before and after putting in place the identified control measures. This will highlight what the risk ranking will be *before* there is any Control Measures in place (inherent Risk Ranking) and what the risk ranking is *after* the Control Measures are in place(residual Risk Ranking). The latter will highlight the effectiveness of the controls.

This process also allows for the prioritisation of risks. If the residual risk ranking, *after* the controls are put in place, is still medium or high, more attention needs to be given to make sure that the controls are implemented and that the 'owner' of the risk is monitoring the progress very carefully so that the risk does not increase.

If the inherent Risk Ranking, before controls, shows the risk as being low, the team can make the decision to tolerate the risk. No formal controls need to be put in place, but risk still need to remain on the live risk register, to ensure visibility and ensure risk does not increase.

3.3.2.1 Inputs

Live Risk Register (output from phase 1)

3.3.2.2 Process

1. This process will be followed in the Inherent Risk ranking assessment (This is the ranking before controls are in place) as well as the Residual Risk Ranking assessment (This is the ranking after controls are put in place)
2. Risk evaluation is the second phase within the risk assessment process and includes the analysis and quantification/ranking of risks.
3. The risk evaluation phase shall be led by a risk assessment team consisting of multidisciplinary specialists/subject matter experts (e.g. Technical; SHE practitioners, cost team, planners etc.) and shall include the relevant employees. The persons used need to be familiar with the organization's processes, standards, procedures, work practices and training levels, to effectively contribute to this exercise.
4. Rank each root cause in terms of its Likelihood and Impact using the scales set out in **Annexure B and Annexure C**
5. The **RISK RANKING** will be automatically (on the excel spreadsheet) calculated by multiplying the impact score and the likelihood score for the assessment before controls are in place, as well

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as after controls are in place. Automatically the risk ranking column is coloured coded to reflect the ranking of the risk, as demonstrated on the Risk Matrix – **Annexure D**, as follows:

Risk Ranking Colour Code
Low risk (Green)
Medium risk (Amber)
High risk (Red)

3.3.2.3 People involved

Accountable: (Aligned with their role)	<ul style="list-style-type: none"> ● General Manager for specific Project groups ● Project Managers for Capital Expansion Projects ● Project Development Manager for Capital Expansion Projects ● Heads of Functional Disciplines within Projects
Responsible:	<ul style="list-style-type: none"> ● Project Manager ● Project Risk Manager & Coordinators
Consulted:	<ul style="list-style-type: none"> ● Functional Leaders (where they are not the accountable person) ● Contractors (where they play a key role)
Informed:	Project Support Risk Department.

3.3.3 Phase 3 - Risk control and monitoring phase

For each root cause identified through a risk register, an appropriate level of mitigation (or risk avoidance) must be established and input must be given by those accountable for managing it (root cause owners). There may be more than one person accountable where there is both a delivery and functional involvement in managing a root cause. There are two levels of Controls which needs to be identified, Preventative Controls and Reactive Controls. (see step 3 and 4 of the process in this section)

Those control measures that provide the greatest mitigation of significant risk need more frequent monitoring. The objective of a control monitoring mechanism is to tell the root cause owner(s) through a systematic and reliable method that the control measure is operating as intended i.e. it is effective in providing the expected amount of mitigation and is in continuous operation. Management therefore need to particularly monitor both the control of those risks that have a high *inherent, before controls*, consequence and/or likelihood.

3.3.3.1 Inputs

Risk Register (output from Phase 1 and Phase 2)

3.3.3.2 Process

1. Risk control and monitoring is the third phase within the risk assessment process and involves determining and implementing the most appropriate risk control strategies in order to adequately mitigate, reduce or eliminate the unacceptable risks to an acceptable level, after the evaluation of the risk.

2. Engage the team involved and the root cause owner(s) in identifying all control measures currently applied or the implementation of new controls to each root cause listed on the Risk Register. Control measures shall be individually classified as either *Preventive controls*, that *reduce the Likelihood of a cause occurring*, or *Reactive controls*, that *reduce the impact of the risk resulting from the root cause*. A Reactive control, such as a contingency plan, may therefore apply to more than one root cause.
- 3 Preventative Controls list the actions that need to be implemented in order to eliminate risks or reduce the **likelihood** of the risk occurring, i.e.: these are the controls that will Pro-actively prevent the risk from occurring in the first place.
- 4 Reactive Controls list the actions taken to reduce the immediate **impact** of the risk occurring, i.e.: if the risk occurs, what actions would be taken to reduce the consequences of the impact, in other words contingency plan of action.
- 5 Ensure that risks are reduced "as far as is reasonably practicable."
- 6 After listing the Preventative Controls as well as the Reactive Controls, you have to Rank each root cause in terms of its Likelihood and Impact **after controls** are in place, using the scales set out in **Annexure B and C**. Please refer back to Phase 2 of the process
- 7 Agree with the team involved and root cause owner(s) a systematic and reliable approach to monitor that the control measures, are working as intended. Document information on current and proposed monitors on the Risk Register.
- 8 The overall accountable person, at the different levels, shall review and monitor the effectiveness of the implemented risk control measures to ensure the effective control of risk.

3.3.3.3 People Involved

Accountable: (Aligned with their role)	• General Manager for specific Project groups
	• Project Managers for Capital Expansion Projects
	• Project Development Manager for Capital Expansion Projects
	• Heads of Functional Disciplines within Projects
Responsible:	• Project Manager
	• Project Risk Manager & Coordinators
Consulted:	• Functional Leaders (where they are not the accountable person)
	• Contractors (where they play a key role)
Informed:	Project Support Risk Department.

3.3.4 Phase 4 – Review, Report and Action

Regular reviews and reports are essential to ensure that risks, threats and opportunity, are being appropriately managed. It is also necessary to escalate the management of some risks to ensure consistent action is taken across the wider Capital Expansion Program or to assess the knock-on effects of mitigating or avoiding a risk on wider program activities. Reporting is also necessary to assure the Integrated Risk Management and Assurance Department within Enterprises Division, that risks are being appropriately managed throughout the Capital Expansion Projects and to meet Eskom corporate governance requirements.

It is very important that the persons responsible escalate high risks within the project, to the responsible Managers, Project Managers or General Managers. The line managers need to approve

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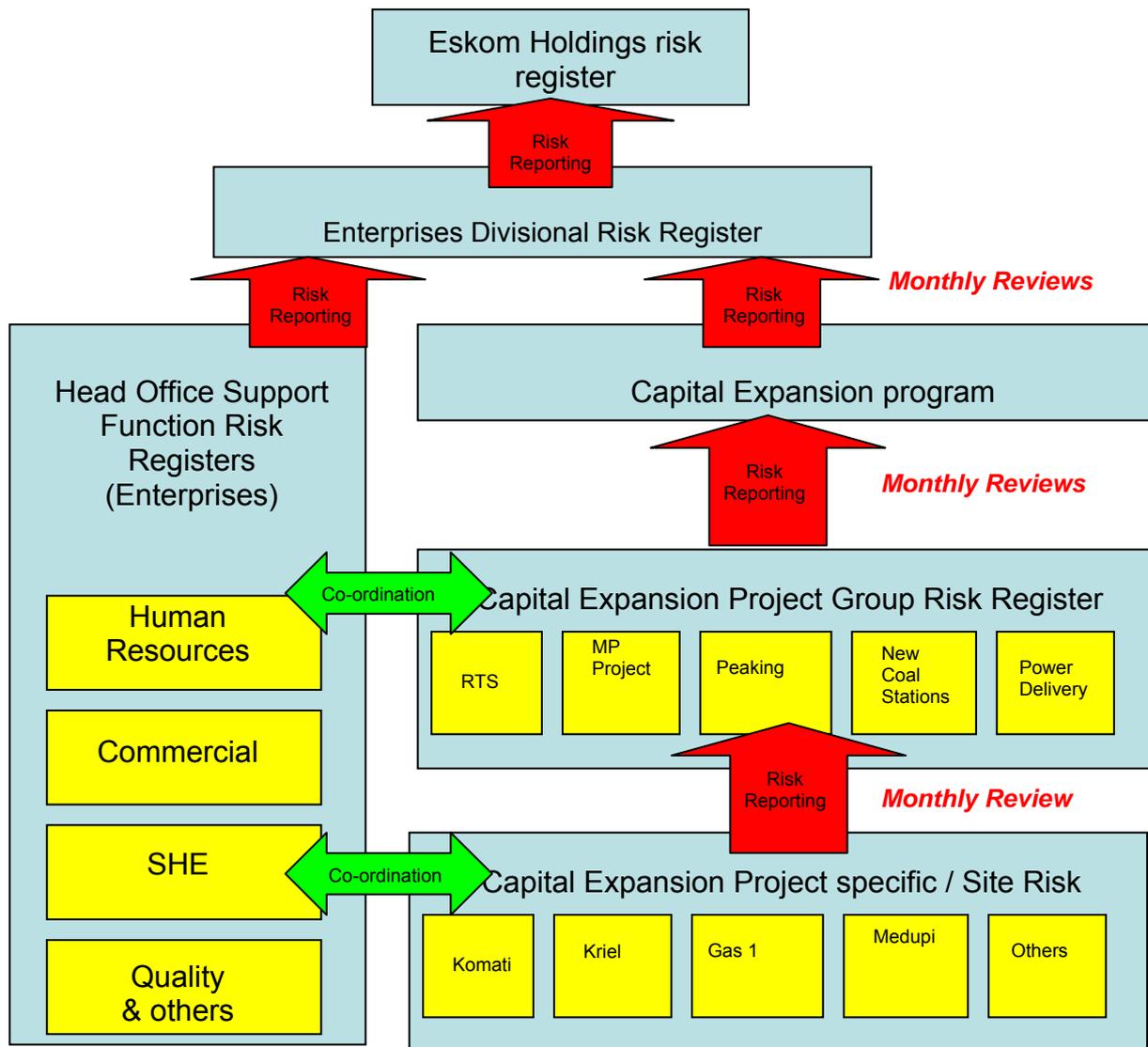
the controls for high risks as it usually has a cost and time impact to the project. If the control strategies are approved it needs to be put in place through the Change Control Process, and highlighted as a change to the project.

Additional to the process described below, the Projects will be expected to review their Risk Register if there are any significant changes. For example reviews should be considered in the following circumstances (not exhaustive):

- When there is a serious concern that something could go wrong
- When there is the need for improvement in the outcome of a task or the need for new ideas.
- When introducing technical or organizational innovations or change
- When specific goals or objectives must be met
- When there is an unexpected new development in the Capital Expansion program.
- At major decision points or points of change in the Project lifecycle
- To help resolve particular issues e.g. procurement strategy
- When required to do so by outside sources e.g. Corporate Governance, Insurers or Regulators
- When consequences can be catastrophic but the likelihood so remote that the event of concern is outside of normal experience

Reporting Structure

Figure 4



3.3.4.1 Inputs

- Risk Register
- Information on changing circumstances affecting risks
- Information on emerging risks
- Information on Risks that have occurred

3.3.4.2 Process

1. Risk Review and Reporting will be done on a monthly basis. However if the Project or Function are in a High Risk stage, more frequent reviews and reporting will be necessary. This will be agreed by Management.
2. High level Risk review meeting will be held once a month to review the live risk registers at different levels. *This meeting can also be incorporated in the existing management meetings*

as an agenda item. All top active Risks needs to be reviewed and effectiveness of the controls assessed. Any emerging risks will be added to the risk register. The meeting needs to be attended by role players' who are key in achieving the described objectives, as well as Root cause owners identified. If a Root Cause owner is outside of the Project Team or could not attend the meeting, he / she needs to be informed about the risk allocated to him / her or changes to risks allocated to him / her by the Project Risk Coordinator. **Total in-depth reviews will be carried out for all levels of the project on a quarterly basis.**

3. The Risk coordinator will help co-ordinate the review and ensure the risk register is prepared and for the person(s) accountable at different levels for the scope of work or functional area.
4. The Risk Manager will agree with each accountable person at the different levels, on the content of his or her Live Risk Register. Issue the risk register to them for inclusion/reference in their monthly management report.
5. Risk Coordinator will send the different levels of Risk Registers to the project Support Risk Management Function on the **First Friday of each month** as well as the documentation centre.
6. Accountable persons shall escalate through their line management all risk register entries that have an inherent Red ranking to their senior management, using the Monthly Summary report in **Annexure E** on the **Second Friday of each Month**. The basis of escalation shall follow established lines of accountability. Risk register entries that are escalated shall also be copied to the Project Support Risk Management function.
7. Depending on whether the risk co-ordinator is within a Project Group or a Function:
 - 7.1 Shall provide to each head office support functional head an extract from the Live Risk Register (held at the Project level) of those Risks where the function has responsibility for managing a root cause, on a monthly basis, if it is applicable; or
 - 7.2 Shall provide to the Projects an extract from the Live Risk Register (held at head Office Support Functional management level) of those risks where the project has responsibility for managing a root cause, on a monthly basis, if it is applicable.

3.3.4.3 People Involved

Accountable: (Aligned with their role)	• General Manager for specific Project groups
	• Project Managers for Capital Expansion Projects
	• Project Development Manager for Capital Expansion Projects
	• Heads of Functional Disciplines within Projects
Responsible:	• Project Risk Manager
	• Risk Coordinators
Consulted:	• Functional Leaders (where they are not the accountable person)
	• Contractors (where they play a key role)
Informed:	• Senior Line Management
	• Project Support Risk Management Function

3.4 Handover of Active Risks

Risks have a continuing life until the circumstances under which the related impact could occur have ceased to apply (are 'closed' risks). It is to be expected, therefore, that those 'active' Risks may be handed over to a new owner.

Handover of 'Active' risks will occur when the project is moving from one stage to another or when accountability has shifted. (E.g. from PDD → CED, CED → Generation or Transmission)

Ensure accountable persons formally handover management and records of Risk Registers containing any active risks to, the new Owner.

3.5 Management of Records

In *the event of not having an electronic documentation management system*, the Risk Coordinator will keep a monthly “snap shot” of the Risk Register. (A “snap shot” is a version of the Live Risk Register, saved as a separate file, on a certain time in the month. Due to the fact that the Risk register will be reviewed on a monthly basis the information will change constantly. This will allow us to be able to see on a monthly basis the progression and if the need be go back to get an accurate reflection of the Risk Register at a specific time.)

The Risk coordinator is accountable for ensuring the safe keeping of the documents and records of each Risk Register if there is no Documentation Management Centre.

In *the event of using an electronic documentation management system* the development, control and distribution of these documents or records shall be incorporated into the system. The Risk Coordinator shall ensure that the completed risk register records or documents are formally handed over to the Documentation Management centre.

The Risk Coordinator will ensure that the Risk Register records remain up to date.

4 Authorisation

This procedure has been seen and accepted by:

Name	Designation
Khumo Morolo	General Manager – Peaking Projects
Kobus Steyn	General Manager – Return to service Projects
Abraham Masango	General Manager – Mpumalanga Projects
Naresh Hari	General Manager – Power Delivery Projects
Roman Crookes	New Coal Project Manager
Peter Knothe	Engineering Department
Sandra van der Merwe	Project Delivery Department

5 Revisions

Date	Rev.	Remarks
September 2007	0	New Procedure

6 Development team

Annexure B Impact Scale

Consequence	Score	Safety	Health	Environment	Project Cost	Schedule	Quality	Operation	Reputation	Legal & Public Liability
Minor	1	Very minor injury (First aid only)	Temporary impairment (Impairment is of a temporary nature and full recovery is probable)	Minor: the lifetime of the impact will be short term (e.g. 0-5 years), or impact will be local extending only as far as the activity	Tens of thousands of R's	Week	Minor	Minor	Complaints from local community	Improvement notice
Moderate	2	Minor injury (medical treatment)	Permanent mild impairment (A chronic condition which causes mild restriction on daily functioning e.g. mild hearing loss)	Moderate: lifetime of the impact medium term (e.g. 5-15 years); or impact will be limited to the site and its immediate surroundings	Hundreds of thousands of R's	Weeks	Moderate	Moderate	Minor local adverse press coverage	Prohibition notice
Significant	3	Minor disabling injury (more than 3 but less than 14 days off work)	Permanent moderate impairment:(A chronic condition which causes significant restriction on daily functioning e.g. moderate hearing loss or breathlessness.)	Significant: long term where the impact will cease after the operational life of the of the activity either because of natural process or by human intervention, or will have an impact on the region	Millions of R's	1 - 3 Months	Significant	Significant	Major local adverse press coverage	Prosecution with fine
Substantial	4	Major disabling injury (more than 14 days off works)	Permanent severe impairment:(A severe terminal illness resulting in death within 1-2 years e.g. mesothelioma)	Substantial: permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient, or will have an impact on a national scale,	Tens of millions of R's	4 - 11 Months	Substantial	Substantial	Regional adverse media coverage	Directors charged, national public enquiry, major compensation claims
Catastrophic	5	Fatalities	Acute terminal illness:(Acute illness with rapid progression to death e.g. acute silicosis)	Catastrophic:the hazard will be permanent or will have a direct impact on human health or impact will result in Legal action, or could affect stakeholder relationships and will be felt across international borders and the duration of the hazard will be permanent	Hundreds of millions of R's	Year	Catastrophic	Catastrophic	National adverse media coverage	Directors convicted, major compensation claims exceeding available cover

Please Note: All undefined categories will have to be defined by project team or used as a guideline

**Annexure C
Likelihood Scale**

Score	Descriptor	Probability of one-off event
1	Improbable	1 in 1000
2	Unlikely	1 in 100
3	Possible	1 in 10
4	Likely	More likely than not
5	Probable	Almost certain

**Annexure D
Risk Matrix**

		Impact Score				
		1	2	3	4	5
Likelihood Score	1	G	G	G	A	A
	2	G	G	A	A	R
	3	G	A	A	R	R
	4	A	A	R	R	R
	5	A	A	R	R	R

Annexure E Monthly Summary Risk Report



Risks report

CED Project: _____

Date: _____

A. The current risk of greatest concern to the CED Project Manager / Discipline Project Manager

Risk Identification	What is the cause of the Risk?	What are the Consequences?	Risk Ranking (H/M/L)	Controls	
				Preventative controls (actions taken to eliminate Risk or reduce the likelihood of the risk occurring)	Reactive controls (action taken to reduce the immediate impact of the risk occurring)

B. Top 10 risks

Risk Identification	What is the cause of the Risk?	What are the Consequences?	Risk Ranking (H/M/L)	Controls	
				Preventative controls (actions taken to eliminate Risk or reduce the likelihood of the risk occurring)	Reactive controls (action taken to reduce the immediate impact of the risk occurring)

C. Emerging Hazards assessed as Red (Inherent Rating)

Risk Identification	What is the cause of the Risk?	What are the Consequences?	Risk Ranking (H/M/L)	Controls	
				Preventative controls (actions taken to eliminate Risk or reduce the likelihood of the risk occurring)	Reactive controls (action taken to reduce the immediate impact of the risk occurring)

Annexure F
Risk Breakdown Structure

Risk Categories

Technical Risk	Management Risk	Commercial Risk	External Risk
Scope definition	Project mgt	Contractual T&C's	Legislation
Requirements	Organisation	Financing	Regulation
Technical processes	Human Resources	Liabilities	Exchange rates
Technology	Communication	Payment terms	Site/facilities
Technical interfaces	Information	Termination	Weather
Performance	HS&E	Internal procurement	Political
Reliability, safety, security	Policy and Procedure	Subcontracts	Pressure groups
Test & acceptance	Reputation	Client stability	Force majeure
	Planning	Partner status	Market condition
			Other