

**PROPOSED POLLUTION CONTROL DAMS &
ASSOCIATED INFRASTRUCTURE AT MEDUPI
POWER STATION ASH DUMP & COAL
STOCKYARD, LIMPOPO PROVINCE**

**FINAL ENVIRONMENTAL
MANAGEMENT PROGRAMME (EMPr):**

**ADDENDUM TO THE ENVIRONMENTAL MANAGEMENT
PLAN FOR THE MEDUPI COAL-FIRED POWER STATION
IN THE LEPHALALE AREA, LIMPOPO PROVINCE**

Submitted as part of the Environmental Impact Assessment Report

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PROJECT DETAILS

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DEFINITIONS AND TERMINOLOGY

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

Environment: the surroundings within which humans exist and that are made up of:

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

TABLE OF CONTENTS

	PAGE
CHAPTER 1: PROJECT DETAILS	1
1.1. Lined Pollution Control Dams Proposed for the Project.....	2
1.2. Findings of the Environmental Impact Assessment Process	4
1.2.1. Potential Impacts during Construction	4
1.2.2. Potential Impacts during Operation	5
CHAPTER 2: PURPOSE & OBJECTIVES OF THE EMP ADDENDUM	6
2.1. Purpose of the EMP and associated Addendum	7
CHAPTER 3: STRUCTURE OF THIS EMP	8
3.1 Project Team	9
CHAPTER 4: MANAGEMENT PROGRAMME FOR CONSTRUCTION	10
4.1. Overall Goal for Construction	10
4.2. Roles and Responsibilities for the Construction Phase of the PCDs and Associated Infrastructure.....	10
4.3. Objectives	10
OBJECTIVE: Management of dust and emissions to air	11
OBJECTIVE: Minimise impacts on surrounding environment	12
OBJECTIVE: Control runoff, soil erosion & degradation, and the prevention of contamination of surface water	14
OBJECTIVE: Protection of sites of heritage value	15
4.4. Detailing Method Statements	16
OBJECTIVE: Ensure all construction activities/practices/procedures are undertaken with the appropriate level of environmental awareness to minimise environmental risk, in line with the specifications of the EMP.....	16
CHAPTER 5: MANAGEMENT PROGRAMME FOR OPERATION AND MAINTENANCE	18
5.1 Overall Goal for Operation and Maintenance	18
5.2 Objectives for Operation and Maintenance	18
OBJECTIVE: Management of possible groundwater contamination	18
OBJECTIVE: Management of possible surface water contamination	20
CHAPTER 6: MANAGEMENT PROGRAMME FOR DECOMMISSIONING	21
CHAPTER 7: FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME	22

PROJECT DETAILS

CHAPTER 1

Eskom Holdings (SOC) Limited's (Eskom) main objective is to provide energy and related services, including the generation, transmission, distribution and supply of electricity. In order to be able to adequately provide for the growing electricity demand, Eskom proposed to construct a new Medupi Power Station and associated infrastructure (including a coal stockpile) in the Lephalale area, in the vicinity of the existing Matimba Power Station. Medupi Power Station will have a maximum capacity of 4 800 Megawatts (MW) and will be coal-fired, with the coal being sourced from local coalfields.

Eskom has received Environmental Authorisation for the construction and operation of this power station and construction is currently underway. In addition, Eskom has received a waste license for the ash dump associated with the power station and a water use license for various water uses, including the storage of wastewater within pollution control dams associated with the ash dump.

Due to delays in the commissioning of the Medupi Power Station, Eskom Holdings Limited identified the need to establish a coal stockyard to accommodate coal which is to be supplied to the power station from Exxaro's Grootegeluk Mine. This coal stockyard was proposed within the footprint of the authorised Ash Dump. This coal stockyard was authorised by the DEA in July 2012 (DEA Ref No. 14/12/16/3/1/531).

The ash dump and excess coal stockyard to be located on the western portion of the north ash dump within the footprint of the Medupi Power Station will require pollution control dams for containment of storm water drainage from these areas. Waste water if not adequately controlled can substantially alter the hydrological characteristics of both surface and groundwater, which can further affect other existing water users within the surrounding areas. Consequently, sound management practices to prevent or minimise water pollution are fundamental for Eskom's operations to be sustainable. Eskom therefore requires additional pollution control dams (PCDs) from that authorised in order to contain the anticipated additional wastewater from the ash dump and coal stockpile areas. PCDs with a combined capacity of approximately 420 000m³ are being proposed in order to ensure adequate containment facilities are available for expected combined water run-off from the coal stockyard and ash dump. It is the intention that the water will be recycled for the ash dump operations, which among others will include dust suppression, in turn conserving water. Associated infrastructure includes a workshop area for maintenance/refuelling of construction vehicles and storage of hazardous material. A broader study area of over 20 ha is being considered within which the PCDs will be constructed, although the actual development footprint will be smaller in extent, with each PCD being approximately 1 000m² in extent.

1.1. Lined Pollution Control Dams Proposed for the Project

The pollution control dams (including the coal stockyard) have been designed as a zero liquid effluent discharge (ZLED) site. A liner system has been allowed for underneath the coal stockyard as well as the pollution control dams to prevent seepage to the underground. The coal stockyard and dams will have a lining system installed as per the Minimum Requirement Standard Specification (DWAF, 1998), Hazardous H:h (i.e. low to medium hazard) (refer to Figure 1.1).

The functions of the different layers for the lining on the coal stockyard are as follows:

- Leachate Collection system - Leachate could result in high leachate head, possible clogging from pioneer layer.
- Primary Clay composite system - The main barrier and high probability to damage than the secondary
- Leak detection system - Has a twofold function, i.e. detecting and collection. It is the first indication of leakage.
- Secondary compacted clay - The final containment layer.



Figure 1.1: The different lining layers of the construction of the pollution control dam

Seepage and dirty run-off from the coal stockyard and ash dump will collect in the pollution control dams from where the water will evaporate. Should it be required, this water will be used for dust suppression.

Lined PCDs are important in preventing seepage to the underground water resources and are therefore important elements of the management of wastewater. The primary function of PCDs is to capture and temporarily retain the dirty water contribution that cannot be discharged to the natural environment. The retained dirty water will be managed through recycling and reuse. Figure 2.2 shows an example of a typical lined PCD.

The operation of the PCDs will include the following:

- » Operate at a level to accommodate dirty water inflow, less outflow and losses and required freeboard.
- » Clean storm water will be diverted away by virtue of the ashing facility being higher than the surrounding land. There will be a beam around the PCD's to prevent mixing of clean and dirty water and it will also act as a diversion barrier.
- » Divert clean storm water away from the dam as far as practically possible.
- » Return of dirty water to the process water system.



Figure 2.2: Example of a typical lined pollution control dam

The preliminary design and layout of the proposed pollution control dams has not been finalised. The designs are subject to the findings of the environmental assessment and geohydrological investigations in conjunction with future design specifications. The preliminary Design drawings and plans will be available for Authority review during the Impact Assessment phases. A leakage detection system is part of each holding dam. The basin of the dam is sloped in such a way that any leakage water will migrate towards a leakage detection sump.

The proposed pollution control dams at Medupi Power Station will be designed in such a way that they will cater for run-off after 2028 when the use of the excess coal stockyard is no longer required. Thereafter they will revert to use for ash as authorised in the ash dump waste license (Ref: 12/9/11/L50/6).

1.2. Findings of the Environmental Impact Assessment Process

The proposed pollution control dams are subject to the requirements of the EIA Regulations published in terms of Section 24(5) of NEMA. In terms of the National Environmental Management Waste Act (Act No 59 of 2008), the construction of the pollution control dams require a Waste License as per GN718. In addition, Eskom requires Authorisation in terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998) for activities listed under this legislation. In terms of the relevant listed activities triggered by this proposed project under this legislation, a Scoping and EIA process has been undertaken.

From the conclusions of the detailed EIA studies undertaken, it has been concluded that impacts during construction and operation will be limited due to the nature of the development and the location within the Medupi Power Station footprint which is already largely transformed as a result of construction activities associated with the power station and associated infrastructure. Potential impacts which could occur as a result of the proposed project are summarised in the sections which follow.

1.2.1. Potential Impacts during Construction

Limited impacts associated with the proposed project are expected as the majority of the proposed development site has already been transformed through activities associated with construction approved under previous Authorisations. The majority of potential impacts identified to be associated with the construction of the PCDs and associated infrastructure are anticipated to be localised and restricted to the proposed site itself, apart from social impacts – job creation -which could have more of a limited regional positive impact should there be additional jobs created due to the project.

No sensitive areas were identified within the proposed development area for the PCDs and associated infrastructure. An artificially created pan was observed within the vicinity of the development site, but would not be impacted by the proposed development. The floristic status of this feature however conforms to the surrounding vegetation, mostly as a result of the extremely small size of the pan. This area therefore does not represent an area of particular sensitivity.

Impacts on ecology (flora and fauna), soils and heritage sites as a result of the proposed development are expected to be of low significance with the implementation of appropriate mitigation measures. Potential impacts on the social environment associated with the proposed development are expected to be both positive and negative and are expected to be limited.

1.2.2. Potential Impacts during Operation

Environmental issues specific to the operation of the pollution control dams and associated infrastructure would be limited and could include impacts on water resources (ground and surface water). These impacts could potentially emanate from seepage or overflow from the dams. This can alter the hydrological characteristics of both surface and groundwater, which can further affect other existing water users within the surrounding areas and even region.

Modelling results show that potential impacts will be limited to the immediate vicinity of the proposed PCDs during both the operation and post-closure phases. No privately-owned boreholes or streams will be impacted. Impacts on groundwater resources are expected to be of low significance with the implementation of appropriate mitigation measures. Any impacts on the groundwater quality of the underlying aquifer from the PCDs will be masked by the potential impacts from the ash dump area should there be a breach of the lining. The project is considered to be acceptable from a groundwater perspective.

The tributary of the Mokolo River is located on the southern side of the study area. In order to prevent pollution of this water resource, it is crucial that storm water management measures are effectively implemented. It is therefore crucial that dirty water systems are lined. The pollution control dams aim to minimise the impacts on surface water through the retention of dirty runoff water from the coal stockyard and ash dam areas.

Potential impacts on surface water resources could however occur as a result of contamination in the event that the PCDs overflow and through the reduction of runoff affecting catchment yield. Impacts on surface water are expected to be limited and of low significance with the implementation of appropriate mitigation measures. The project is considered to be acceptable from a groundwater perspective.

PURPOSE & OBJECTIVES OF THE EMP ADDENDUM

CHAPTER 2

An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced”¹. The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMP is to help ensure compliance with recommendations and conditions specified through an EIA process, as well as to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the proposed PCDs and associated infrastructure. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

An EMPr provides a link between the impacts predicted and mitigation measures recommended within the Environmental Impact Assessment (EIA) Report, and the implementation activities of a project to ensure that these activities are managed and mitigated so that unnecessary or preventable environmental impacts do not result. The EMP provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site establishment) through those incurred during the construction activities themselves (erosion potential, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation (impacts on water resources). The EMP also defines monitoring requirements in order to ensure that the specified objectives are met.

Eskom have an approved EMP in place for the construction, operation and maintenance activities associated with the Medupi Power Station (refer to EMP Revision 2, September 2010). This EMP is currently successfully utilised and in force at the Medupi Power Station (a 4800 MW coal-fired power station) currently under construction in the Lephalale area. Regular compliance audits to the EMP requirements are undertaken by the Environmental Control Officer (ECO) and an external auditor. As such, it is not deemed necessary to reiterate all the specifications or responsibilities of this approved EMP which are currently being applied to all components of the larger Medupi Power Station project, and therefore this *addendum to the approved EMP* has been prepared to specifically address the potential impacts resulting from construction and operation of the PCDs and associated infrastructure.

¹ Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*, 2005

2.1. Purpose of the EMP and associated Addendum

The purpose of the Medupi Power Station EMP (September 2010) as well as this addendum to the approved EMP is to assist in ensuring continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the project. An effective EMP is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMP has the following objectives:

- » To outline mitigation measures, and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation/maintenance phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the project.
- » To identify measures that could optimise beneficial impacts.
- » To ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » To ensure that all environmental management conditions and requirements as stipulated in the Environmental Authorisation (once issued) are implemented throughout the project life-cycle.
- » To ensure that all relevant legislation (including national, provincial and local) is complied with during the construction and operation phases.
- » To propose mechanisms for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » To facilitate appropriate and proactive response to unforeseen events or changes in project implementation that was not considered in the EIA Process.

This addendum to the approved EMP has been developed as a set of environmental specifications (i.e. principles of environmental management) which are appropriately contextualised to provide clear guidance in terms of the implementation of these specifications for the proposed project.

This addendum to the approved EMP has been compiled in accordance with Section 33 of the EIA Regulations and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. It should be noted that since this addendum to the EMP is part of the EIA Process undertaken for the proposed project, it is important that this document be read in conjunction with the EIA Report (November 2013). In addition, this addendum to the approved EMP must be read in conjunction with the relevant sections and appendices of the Medupi Power Station EMP Revision 2 (September 2010).

STRUCTURE OF THIS EMPr

CHAPTER 3

Several procedures are necessary for Eskom to achieve environmental compliance for the Medupi Power Station. These are described in detail within the Medupi Power Station EMP Revision 2 (September 2010). In order to ensure site-specific compliance associated with the construction and operation of the proposed PCDs and associated infrastructure, this EMP addendum includes the statement of an over-arching environmental **goal**, as well as lists a number of **objectives** in order to meet this goal. The management programme has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions monitoring requirements and performance indicators. A specific environmental management programme table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies

Project component/s	List of project components affecting the objective, i.e.: » PCDs and associated infrastructure
Potential Impact	Brief description of potential environmental impact if objective is not met
Activity/risk source	Description of activities which could impact on achieving objective
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion

Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management Programme.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change (i.e. in terms of the components and/or layout of the facility).
- » Modification to or addition to environmental objectives and targets.
- » Relevant legal or other requirements are changed or introduced.
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

3.1 Project Team

This draft addendum to the approved EMP was compiled by:

	Name	Company
EMP Compilers:	Jo-Anne Thomas	Savannah Environmental
Specialists:	Martiens Prinsloo	Future Flow GPMS
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The Savannah Environmental team have extensive knowledge and experience in environmental impact assessment and environmental management, having been involved in EIA processes over the past ten (10) years. They have managed and drafted Environmental Management Programmes for other power generation projects throughout South Africa, including numerous renewable energy facilities and projects planned as part of Medupi Power Station.

MANAGEMENT PROGRAMME FOR CONSTRUCTION

CHAPTER 4

4.1. Overall Goal for Construction

Overall Goal for Construction: Undertake the construction phase of the PCDs and associated infrastructure in a way that:

- » Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
- » Enables the construction activities to be undertaken without significant impacts on the environment.

This addendum to the approved EMP must be read in conjunction with the relevant sections and appendices of the Medupi Power Station EMP Revision 2 (September 2010). This addendum relates only to activities associated with the coal stockyard. Environmental specifications and guidelines included within the approved EMP are not repeated here.

4.2. Roles and Responsibilities for the Construction Phase of the PCDs and Associated Infrastructure

As the Proponent, Eskom must ensure that the implementation of the coal stockyard complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMP, and the implementation of the EMP through its integration into the contract documentation. Eskom will retain various key roles and responsibilities during the construction of the construction of the coal stock yard. These are outlined below. Specific environmental roles and responsibilities are detailed in the approved EMP for Medupi Power Station.

4.3. Objectives

In order to meet the goal detailed in Section 4.1 above, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE: Management of dust and emissions to air

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles.

Project component/s	Construction and establishment activities associated with the establishment of the PCDs and associated infrastructure.
Potential Impact	<ul style="list-style-type: none"> » Dust and particulates from vehicle movement to and on-site, and temporary stockpiles affecting the surrounding properties. » Release of minor amounts of air pollutants (for example NO₂, CO and SO₂) from vehicles and construction equipment.
Activities/risk sources	<ul style="list-style-type: none"> » Clearing of vegetation (where required) and stripping and stockpiling of topsoil. » Excavation, grading, scraping. » Transport of materials and equipment on access roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle engines.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase. » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase.

Mitigation: Action/control	Responsibility	Timeframe
Appropriate dust suppressant must be applied on all exposed areas and stockpiles as required to minimise/control airborne dust.	Contractor	Duration of contract
Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins.	Contractor	Duration of contract
Speed of construction vehicles must be restricted, as defined by the ECO.	Contractor	Duration of contract
Construction vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract
If monitoring results or complaints indicate inadequate performance against the criteria indicated, then the source of the problem must be identified, and existing procedures or equipment modified to ensure the problem is rectified.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No complaints from affected residents or community regarding dust or vehicle emissions from construction activities. » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. » Road-worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.
Monitoring	Monitoring must be undertaken as per the approved Medupi Power Station EMP.

OBJECTIVE: Minimise impacts on surrounding environment

There are four (4) protected tree species within the proposed development site was confirmed i.e. *Acacia erioloba* (Camel thorn), *Adansonia digitata* (Baobab), *Boscia albitrunca* (Shepherd's tree) and *Combretum imberbe* (Leadwood). The removal of these trees would require a tree permit. Eskom is already in possession of a valid Tree Permit for the proposed development site.

No red data fauna species were recorded on the farm Eenzaamheid during the EIA undertaken for the power station. Likely, impacts resulting from the proposed construction activity are expected to result in animal species migrating from this property to nearby areas that is suited to their breeding-, general habitat- or territorial requirements.

The Baboon Spider has been recorded on site during the construction of the Medupi Power Station and there is therefore a possibility that this species could occur in the area proposed for the PCDs and associated infrastructure.

Project Component/s	PCDs and associated infrastructure
Potential Impact	Irreversible habitat alteration of an area of relatively poor floristic species diversity
Activities/Risk Sources	Construction activities, maintenance activities.
Mitigation: Target/Objective	Minimise impacts on the environment

Mitigation: Action/Control	Responsibility	Timeframe
Prevent impacts on any surface water as a result of hazardous materials, contamination, unnecessary	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
crossing by vehicles or personnel, extraction, drinking or other human uses, construction and maintenance activities.		
The removal or picking of any protected or unprotected plants shall not be permitted and no horticultural specimens (even within the demarcated working area) shall be removed, damaged, or tampered with unless agreed to by the ECO.	Contractor	Construction
No painting or marking of rocks or vegetation to identify locality or other information shall be allowed as it will disfigure the natural setting. Marking shall be done by steel stakes with tags, if required.	Contractor	Construction
Make use of existing access roads, ensuring proper upgrade/ construction/ maintenance in order to limit erosion, proliferation of weeds.	Contractor	Construction
Use of branches of trees and shrubs for fire making purposes is strictly prohibited.	Contractor	Construction
Prevent open fires; provide demarcated fire-safe zones, facilities, and fire control measures.	Contractor	Construction
Fire fighting equipment shall be made available on all vehicles and at various suitable points within the development site.	Contractor	Construction
No animal may be hunted, trapped, or killed for any purpose whatsoever.	Contractor	Construction
In the event that animals are present that may pose a risk to human safety, a suitable animal handler must be requested to remove the animal in an environmentally responsible manner.	Contractor	Construction
Ensure adequate surface restoration and resloping of disturbed areas in order to prevent erosion, taking cognisance of local contours and landscaping.	Contractor	Construction
In the event of Baboon spiders or any other protected fauna being present, obtain the necessary permits to relocate these.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » Necessary tree permits are in place. » Necessary permits to impact on baboon spiders or any other protected fauna (if present) are in place.
Monitoring	Implement a monitoring programme of which the aims and objectives should be to monitor compliance to the approved EMP and addendum to the approved EMP.

OBJECTIVE: Control runoff, soil erosion & degradation, and the prevention of contamination of surface water

Bare surfaces are associated with high erosion. Vegetation will be stripped around the area demarcated for the PCDs and associated infrastructure. This increases the potential of sediment transport and impacts on surface water resources.

Project component/s	PCDs and associated infrastructure
Potential Impact	<ul style="list-style-type: none"> » Soil erosion » Impacts on surface water resources
Activities/risk sources	<ul style="list-style-type: none"> » Water and wind erosion of cleared and excavated areas. » Excavation, mixing, dumping, stockpiling, and compaction of soil. » Concentrated discharge of water from construction activity. » Site preparation and earthworks. » Liner or plant equipment installation. » Mobile construction equipment movement on site. » Siltation during filling of the depression.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Minimise degradation of soil by construction activity. » Conserve topsoil by stockpiling and re-using in disturbance areas. » Minimise erosion of soil from site during construction. » Minimise deposition of soil into drainage lines. » Prevent siltation of downstream areas due to in filled depression area.

Mitigation: Action/control	Responsibility	Timeframe
Removal of vegetation must be concentrated to areas demarcated for pollution control dams	Contractor	Construction
Erosion features must be stabilised with appropriate erosion control measures, if they develop and monitored to check for their efficacy.	Contractor	Construction
Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. Limit the height of stockpiles as far as possible to reduce compaction.	Contractor	During site establishment, and any activity related to earthworks as well as the duration of construction
Rehabilitate any disturbed areas adequately after construction in that area is complete in order to stabilise landscapes.	Contractor	Post-construction
Ensure that the slope of stockpiled material is such that surface runoff is minimised.	Contractor	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
Vehicular traffic must be controlled during construction, confining access and roadways, where possible, to proposed or existing road alignments.	Contractor	Duration of contract
As far as possible, access to the construction site should be restricted to a controlled access point.	Contractor	Duration of contract
Internal access roads should be kept to a minimum. Use existing roads wherever possible.	Contractor	During site establishment
Movement of vehicles on-site is to be on approved and formalised access roads only, which shall be adequately maintained throughout construction. Where temporary tracks are required these are to be ripped and rehabilitated as soon use of the track in an area is no longer required. Any access in such areas must be approved by the ECO and rehabilitation done to the satisfaction of the ECO.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Acceptable level of soil erosion around site, as approved by ECO. » Acceptable level of increased siltation in drainage lines, as approved by ECO. » Acceptable level of soil degradation, as approved by ECO. » Acceptable state of excavations, as approved by ECO.
Monitoring	<ul style="list-style-type: none"> » On-going monitoring of area by ECO during construction. » An incident reporting system will record non-conformances.

OBJECTIVE: Protection of sites of heritage value

Although no sites, features or objects of cultural heritage significance were identified in the study area, it may possible that sites will be uncovered during excavation activities associated with construction. If at any stage during the construction phase any archaeological artefact is observed, it would be vital to stop the work immediately and report this occurrence to the South African Heritage Resources Agency and/or a professional archaeologist as soon as possible so that appropriate mitigation measures can be implemented.

Project component/s	PCDs and associated infrastructure
Potential Impact	Heritage objects or artefacts found on site are inappropriately managed or destroyed.
Activity/risk source	<ul style="list-style-type: none"> » Site preparation and earthworks. » Foundations or plant equipment installation.

	» Mobile construction equipment movement on site.
Mitigation: Target/Objective	To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation. To create awareness amongst contractor staff of procedures related to the protection of cultural and heritage issues as well as procedures to follow in the event of a find.

Mitigation: Action/control	Responsibility	Timeframe
If a heritage object is found, work in that area must be stopped immediately, the ECO consulted and appropriate specialists brought in to assess to site, notify the administering authority of the item/site, and undertake due/required processes.	Eskom Holdings (SOC) Limited, ECO, contractor, and heritage specialist	Duration of contract

Performance Indicator	» All heritage items located are dealt with as per the legislative guidelines. » A record is kept of all instances of accidental disturbance of heritage material, as well as post construction review of impacts on landscape context.
Monitoring	Supervision of the clearing and earthworks for this project by the ECO/or a suitably qualified person throughout construction phase.

4.4. Detailing Method Statements

OBJECTIVE: Ensure all construction activities/practices/procedures are undertaken with the appropriate level of environmental awareness to minimise environmental risk, in line with the specifications of the EMP

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMP will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO prior to any activities taking place.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to the following, as appropriate:

- » Construction procedures;
- » Materials and equipment to be used;
- » Getting the equipment to and from site;
- » How the equipment/material will be moved while on-site;
- » How and where material will be stored;
- » The containment (or action to be taken if containment is not possible) of leaks or spills of any hazardous liquid or material that may occur;
- » Timing and location of activities;
- » Compliance/non-compliance with the Specifications, and
- » Any other information deemed necessary by the Site Manager.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager or his delegate, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract, this EMP, the Environmental Authorisation or relevant environmental legislation.

MANAGEMENT PROGRAMME FOR OPERATION AND MAINTENANCE

CHAPTER 5

5.1 Overall Goal for Operation and Maintenance

Overall Goal for Operation: To ensure that the operation and maintenance of the PCDs and associated infrastructure does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the proposed project in a way that:

- » Ensures that operation and maintenance activities are properly managed in respect of environmental aspects and impacts.
- » Enables the operation phase to continue without significant impacts on the environment.

This addendum to the approved EMP must be read in conjunction with the relevant sections and appendices of the Medupi Power Station EMP Revision 2 (September 2010). This addendum relates only to activities associated with the PCDs and associated infrastructure. Environmental specifications and guidelines included within the approved EMP are not repeated here.

5.2 Objectives for Operation and Maintenance

In order to meet the goal for operation and maintenance, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE: Management of possible groundwater contamination

Contamination from the pollution control dams can contaminate the underlying aquifers. It is planned that the pollution control dams will be fully lined to prevent any contamination seeping into the underlying aquifers as per normal practise. These ponds should also be sized and designed to be able to accommodate 1:50 year rainfall events without accidental spillage occurring.

Dedicated monitoring boreholes have been installed by Eskom to monitor for groundwater quality changes close to the ash dump area and pollution control dams. It is recommended that the existing groundwater quality monitoring program be continued. The newly drilled dedicated monitoring boreholes around the PCDs should be included in the program. The boreholes have been constructed such that they can be used to

reliably monitor groundwater quality changes in the area. Specific recommendations in this regard are detailed below.

Project component/s	PCDs and associated infrastructure
Potential Impact	Impact of groundwater quality due to poor quality seepage from the PCDs
Activity/risk source	Contamination from potential spillage, overflow and breaching of the PCD lining
Mitigation: Target/Objective	To ensure that groundwater is not contaminated.

Mitigation: Action/control	Responsibility	Timeframe
Ensure the integrity of the liner installed below the PCDs through the continual monitoring of the leakage detection system and the results of groundwater monitoring in the surrounding area	Eskom Holdings (SOC) Limited and contractor	Duration of operation
Establish 6 dedicated monitoring boreholes to track groundwater quality changes as a result of the PCDs	Eskom Holdings (SOC) Limited and contractor	Duration of operation

Performance Indicator	» Results from the water quality monitoring should be within the accepted levels.
Monitoring	<p>» It is recommended that the existing groundwater quality monitoring program be continued. The dedicated monitoring boreholes around the ash dump area and relevant surface infrastructure that was installed during the drilling program should be included in the program. The boreholes have been constructed such that they can be used to reliably monitoring groundwater quality changes in the area.</p> <p>» Chemical elements that should be analysed for include:</p> <ul style="list-style-type: none"> * pH * Electrical Conductivity (EC) * Alkalinity (Alk) * Chloride (Cl) * Sulphate (SO₄) * Nitrate (NO₃) * Ammonium (NH₄) * Phosphate (PO₄) * Fluoride (F) * Calcium (Ca) * Magnesium (Mg) * Sodium (Na) * Potassium (K) * Aluminium (Al) * Iron (Fe) * Manganese (Mn) * Total Chromium (Cr)

	<ul style="list-style-type: none"> * Copper (Cu) * Nickel (Ni) * Zinc (Zn) * Cobalt (Co) * Cadmium (Cd) * Lead (Pb) <ul style="list-style-type: none"> » During the initial 12 month period it is recommended that the monitoring programme be implemented on a monthly basis in order to obtain a background indication of seasonal changes in the area. » Once the initial 12 month period is completed the time increments can be increased to quarterly sampling runs, depending on the outcome of the first 12 months of monitoring.
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OBJECTIVE: Management of possible surface water contamination

Water quality impacts are due to a change in natural conditions and enhancement of pollution from sources. If the PCDs overflow, the surrounding environment will be polluted and during storm events, storm water from the external catchment will be in contact with the contaminated soils. This will result in the transportation of contaminants to the nearby environment.

Project component/s	PCDs and associated infrastructure
Potential Impact	Impact of surface water quality due to contamination of runoff water
Activity/risk source	Contamination from potential spillage, overflow and breaching of the PCD lining
Mitigation: Target/Objective	To minimise contamination on surface water resources.

Mitigation: Action/control	Responsibility	Timeframe
Only environmentally friendly materials must be used during the construction phase to minimise pollution	Eskom Holdings (SOC) Limited and contractor	Duration of operation
A 0.8m freeboard volume must be determined and considered during the design phase	Eskom Holdings (SOC) Limited and contractor	Duration of operation

Performance Indicator	<ul style="list-style-type: none"> » Trends in water quality changes must be observed. » Visual inspection to ensure that silt build up does not reduce the design capacity.
Monitoring	<ul style="list-style-type: none"> » A surface water monitoring program must be designed and implemented as a management tool.

**MANAGEMENT PROGRAMME FOR
DECOMMISSIONING**

CHAPTER 6

The PCDs and associated infrastructure will have a lifespan of approximately 50 years. Thereafter, the site will be decommissioned together with the power station and other infrastructure, unless it is feasible to extend the life of this power station. Decommissioning would need to be undertaken in accordance with the legal requirements at the time.

FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

CHAPTER 7

The EMPr is a dynamic document, which must be updated when required. It is considered critical that this draft EMPr be updated to include site specific information and specifications as the project progresses. This will ensure that the construction and operation activities are planned and implemented in such a way that impacts on the environment are minimised.