
MEDUPI POWER STATION, LIMPOPO PROVINCE

ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR OPERATION AND MAINTENANCE REVISION 1

March 2014

Prepared for

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PROJECT DETAILS

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DEFINITIONS AND TERMINOLOGY

Ash disposal facility: The ash that is created from the burning of coals is transported after conditioning with 10-15 % moisture via a conveyor transfer system and disposed of in an ash dump. Low quality water is used for dust suppression and any decant is recycled for re-use.

Bag Filters: A collection device that uses fabric bags to filter particulates/ash particles out of a gas stream.

Boiler: Where the pulverised coal is burnt/combusted at extremely high temperatures, generating steam with high pressure and temperature in the tubing in the boiler walls.

Contractor: A person or company appointed by Eskom to carry out stipulated activities.

Direct Dry-cooled technology: Cooling is by means of fans instead of air. This technology is less water intensive than power stations utilising conventional wet-cooling systems. A dry cooled plant shows no visible wet plumes, e.g. fogs or shadow.

Emergency: An undesired event that does result in a significant environmental impact and requires the notification of the relevant statutory body such as a local authority.

Emissions: The release or discharge of substances into the environment, generally referring to the release of gases or particulates into the air.

EMP: Environmental Management Plan. A detailed plan of action prepared to ensure that recommendations for preventing the negative environmental impacts and where possible improving the environment are implemented during the life-cycle of a project. This EMP focuses on the operational and maintenance phase.

Environment: In terms of the National Environmental Management Act (NEMA) (No 107 of 1998), "environment" means 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) of (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 Practitioner: An independent suitably qualified individual who would on behalf of Eskom, on a daily basis monitor the project compliance with conditions of the

Record of Decision, environmental permits, environmental legislation and recommendations of this Environmental Management Plan.

Environmental Impact: A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

Flue Gas Desulphurisation (FGD): The process of removing sulphur oxides, primarily SO₂, from the combustion gases.

Environmental Method Statement: A written submission by the Contractor to the Site Manager in response to Environmental Specification or a request by the Client, setting out the construction equipment, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Site Manager when requesting the Environmental Method Statement, in such detail that the Site Manager is enabled to assess whether the Contractors' proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

Gaseous Emissions: The elements / compounds that make up the emissions from the power station stacks in their vapour phase, e.g. carbon dioxide (CO₂), nitrogen oxides (NO_x) and sulphur dioxide (SO₂).

Incident: An undesired event which may result in a significant environmental impact but can be managed through internal response.

Occupational noise: Sustained exposure of employees to noise experienced in the workplace.

Particulate Matter (PM): The collective name for fine solid or liquid particles suspended in the atmosphere, including dust, smoke, soot and pollen. Particulate matter is classified as a criteria pollutant, thus national air quality standards have been developed in order to protect the public from exposure to the inhalable fractions. PM can be principally characterised as discrete particles spanning several orders of magnitude in size, with inhalable particles falling into the following general size fractions:

- » PM10 - generally defined as all particles equal to and less than 10 microns in aerodynamic diameter; particles larger than this are not generally deposited in the lung;
- » PM10-2.5, also known as coarse fraction particles - generally defined as those particles with an aerodynamic diameter greater than 2.5 microns, but equal to or less than a nominal 10 microns
- » Ultra fine particles generally defined as those less than 0.1 microns.

Pulverised fuel (PF) technology: With this technology, coal is first pulverised, then blown into a furnace where it is combusted at high temperatures. The resulting heat is used to raise steam, which drives a steam turbine and generator.

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OVERVIEW OF THE PROJECT

CHAPTER 1

The Medupi Power Station is located in the Lephalale area of the Limpopo Province on approximately 700 ha of the farm Naauw Ontkomen 509 LQ. The Medupi Power Station received a Record of Decision (Ref: 12/12/20/695) from the Department of Environmental Affairs (DEA) on 21/09/2006.

Ancillary infrastructure associated with the power station includes:

- » Coal stockyard situated on the farm Eenzaamheid 687 LQ.
- » Above-ground ash disposal facility situated on the farm Eenzaamheid 687 LQ
- » A coal conveyor belt and 10 000t silo situated on the farm Turfvlakte 463 LQ.
- » An overland ash conveyor belt.
- » Raw water reservoir located on the farm Kuipersbult 511 LQ
- » Water supply system to the power station and water supply pipelines.

The following authorisations are already in place for various activities at Medupi:

1. The Medupi Power Station RoD (Ref: 12/12/20/695)
2. The Medupi Power Station RoD Amendment (Coal conveyor re-alignment)
3. The Medupi Power Station Amendment (removal of the requirement for carbon monoxide monitoring)
4. The Medupi Raw Water Reservoir and Associated Pipelines RoD (Ref: 12/12/20/1139)
5. The Medupi Raw Water Reservoir and Associated Pipelines RoD Amendment (increase in storage capacity)
6. The Medupi Power Station Ash storage, -treatment and-disposal licence (Ref: 12/9/11/L50/6)
7. The Telecommunications mast for Medupi RoD (Ref: 12/12/20/1228)
8. The re-alignment of a Portion of the Afguns Road RoD (Ref: 12/12/20/1179) –
9. The Medupi Power Station Environmental Management Plan (EMP) (Ref:12/12/20/695) as amended.
10. The Grootegeluk EMPR amended for the Coal silo, Coal conveyor and Associated infrastructure between the Grootegeluk Coal mine and Medupi Power Station (Ref: 5/3/2/50).
11. The Medupi Excess Coal Stockyard RoD (Ref: 14/12/16/3/3/1/531).

The Medupi Power Station will have a maximum installed capacity of 4800 MW (6 x 800 MW units). A site layout plan is included within Appendix A.

Medupi Power Station is to be operated as a super-critical, pulverised fuel power station utilising direct dry-cooled technology. The power station will utilise fabric filter bags as its primary pollution abatement technology which will work at approximately 99.8%

efficiency once fully operational (for particulate emissions, anticipated to be less than 50 mg/Sm³), and will have low NO_x burners and overfire air for lower NO_x emissions. In terms of sulphur dioxide emissions, the power station is being constructed to be flue gas desulphurisation (FGD) ready, i.e. physical space is being allocated for the FGD plant and the smokestacks (at 220 m height) will be lined with FGD compatible materials, as Medupi will be retrofitted with a FGD during the first General Outage (GO) cycle of each unit, subject to water availability. When fully operational, the power station is to strive towards a zero liquid effluent discharge philosophy.

Coal for use at Medupi Power Station will be sourced from the Exxaro's adjacent Grootegeluk Colliery (located to the north-west of Medupi Power Station), to be delivered to the power station via conveyor belts. A part of the conveyor system, the associated infrastructure, included a coal silo, which would be in the existing mining area and act as a transfer facility between the mine and Eskom. The coal silo will have a transfer capacity of 10 000 tons.

The conveyor belt system alignment follows an alignment cutting through the farms Enkelbult and Turfvlakte (both owned by Exxaro who has prospecting and mining rights on these properties) in a southerly direction towards the farm Naauwontkomen 509 LQ. This alignment is approximately 4,5 km in length (and is known as the western alignment which was authorised by an amendment to the RoD). Eskom's conveyor system has a carrying capacity of 4 000 tons/hour. Eskom will draw the coal from the bottom of the silo through belt feeders onto the coal overland conveyor which will convey coal to the power station. This silo is a transfer point and forms part of the conveyor belt ancillary infrastructure and the management of the associated environmental impacts fall within the scope of this EMP.

PURPOSE & OBJECTIVES OF THE EMP

CHAPTER 2

An Environmental Management Plan (EMP) 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.

In accordance with Condition 3.2.3.4 of the RoD, Eskom must submit an operational phase EMP to the DEA and other relevant provincial and local authorities for acceptance, prior to the completion of the construction phase and the inception of the operational phase of the development. The revised operational EMP will be seen as a dynamic document which must be updated on an on-going basis as the project develops. No Eskom procedure regarding the frequency of revisions to the operational EMP is in place but should be captured in the power stations ISO 14001 Environmental Management System (EMS). Any substantial changes to the operational EMP, which may be undertaken by Eskom from time to time, must be submitted to DEA for acceptance before such changes could be effected.

2.1. Purpose of the EMP

The objective of this EMP 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. This EMP provides specific environmental guidance for the operation and maintenance phase of the Medupi Power Station, and is intended to manage and mitigate operation and maintenance activities so that unnecessary or preventable environmental impacts do not result.

The purpose of the EMP is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMP is concerned with both the immediate outcome as well as the long-term impacts of the project.

This EMP has the following objectives:

- » To outline mitigation measures, and environmental specifications which are required to be implemented for the operation/maintenance phase of the power station in order to improve overall environmental performance and compliance during operation and maintenance.
- » To identify measures that will optimise beneficial impacts during operation and maintenance.

- » To ensure that the operation and maintenance activities associated with the power station 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 are implemented throughout the project life-cycle.
- » To ensure that all relevant legislation (including national, provincial and local) is complied with during the operation and maintenance of the power station.
- » To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- » To specify a monitoring programme / mechanisms for monitoring compliance to the approved OEMP and RoD, and preventing long-term or permanent environmental degradation. The monitoring programmes in this OEMP will be subject to the approval of the DEA and aligned with the conditions of the Record of Decision – Ref 12/12/20/695. Once approved, the monitoring requirements must be captured in the power stations EMS.
- » To facilitate appropriate and proactive response to unforeseen events or changes in project implementation that were not considered in the EIA process.
- » To establish linkages to the relevant Eskom HSE specifications and communications procedures as well as Environmental performance monitoring and measurement procedures as part of the EMS.

The EMP has been developed as a set of environmental specifications (i.e. principles of environmental management for the operation and maintenance of the Medupi Power Station), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications.

2.2. Applicable Documentation

The following environmental documentation is applicable for the project, and must be read in conjunction with this EMP:

- » Final Environmental Scoping Report for the proposed new Coal-Fired Power Station in the Lephalale Area, Limpopo Province (Bohlweki Environmental, November 2005).
- » Final Environmental Impact Assessment Report for the proposed new Coal-Fired Power Station in the Lephalale Area, Limpopo Province (Bohlweki Environmental, May 2006).
- » Scoping and Impact reports related to additional authorisations.
- » Environmental Authorisations (refer to Appendix B), including:
 - * Record of Decision (RoD) for the *Medupi Power Station and associated infrastructure* issued on 21 September 2006 by the National Department of Environmental Affairs and Tourism.

- * Environmental Authorisation for the *raw water reservoir and pipelines* issued on 27 October 2008 by the National Department of Environmental Affairs and Tourism.
- * Environmental Authorisation for the *construction of a telecommunications mast for Medupi Power Station* issued on 18 September 2008 by the National Department of Environmental Affairs and Tourism.
- * Environmental Authorisation for the *re-alignment of a portion of the Afguns Road in the vicinity of the Medupi Power Station* issued on 6 November 2008 by the National Department of Environmental Affairs and Tourism.
- * *Amendment of Record of Decision for the construction of Medupi Power Station: Coal Supply Conveyers*, issued on 21 August 2008 by the National Department of Environmental Affairs and Tourism.
- * *Amendment of Record of Decision for the construction of Medupi Power Station to remove the requirement for Carbon Monoxide monitoring*, issued on 26 January 2009 by the National Department of Environmental Affairs and Tourism.
- * *Integrated Water Use License for the Medupi Power Station* issued on 13 February 2009 by the Department of Water Affairs and Forestry and subsequent amendments as well as associated approvals.
- » Generation Primary Energy Division Primary Energy (water); Medupi power station technical report.
- » Eskom's operational specifications (refer to Appendix C).
- » The Medupi Power Station EMS – as amended:
 - * Medupi Environmental Policy (200-73979)
 - * Procedure for the identification and assessment of environmental aspects and impacts (200-73975)
 - * Environmental legal and other requirements (200-73977)
 - * Medupi EMS scope and manual (200-73971)
 - * Environmental training, awareness and competence (200-73973)
 - * Identification and application of environmental operational controls (200-73969)
 - * Health, Safety and Environmental Communications procedure (200-38432)
 - * Environmental Performance Monitoring and Measurement Procedure (200-73970)
 - * Handling of HSE non-conformities and corrective and preventative action (200-38426)
 - * Health, Safety and Environmental incident management procedure (200-10506)
 - * Health, Safety and Environmental audit procedure (200-38428)
 - * Management Review procedure (200-73968)

In compiling this EMP, cognisance has been taken of the conditions of the environmental authorisations obtained for the various aspects of the Medupi Power Station (refer to Appendix B). In addition, this EMP for operation and maintenance activities has been

compiled in accordance with Section 33 of the EIA Regulations (dated June 2010 as amended), in terms of the National Environmental Management Act 107 of 1998. The EMP is to be supported by the requirements to be detailed by the project Environmental Manager in accordance with the ISO 14001 management system for Medupi. It must be borne in mind that the EMP is a dynamic document, which will be updated as and when required throughout the life-cycle of the power station. This EMP will furthermore be updated to reflect any authority decisions or requirements communicated during the EMP approval stage, or as a result of any substantive amendments to the EMP requiring authority approval thereafter.

Should there be a conflict of interpretation between this EMP and the RoD, the stipulations in the RoD shall prevail over that of the EMP, unless otherwise agreed by the Department of Environmental Affairs (DEA) in writing. Similarly, any provisions in current legislation overrule any provisions or interpretations within this EMP. Any determinations on a conflict must be amended accordingly to ensure consistent and appropriate implementation.

2.3. Structure of the EMP

The first two chapters of this EMP provide background to the EMP and the Medupi Power Station. The sections which follow considers the operation and maintenance activities associated with the Medupi Power Station.

This section sets out the procedures necessary for Eskom to ensure environmental compliance during the operation and maintenance of the Medupi Power Station. In order to ensure site-specific compliance associated with the power station operation and maintenance, this EMP 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 plan 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 plan table has been established for each environmental objective. The information provided within the EMP 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
Potential Impact	Brief description of potential environmental impact if objective is not met

Activity/risk source	Description of activities which could impact on achieving the objective
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion

Mitigation: Action/control	Responsibility	Milestone
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Period for implementation or review

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.
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

ENVIRONMENTAL GUIDELINES, LEGISLATION AND STANDARDS

CHAPTER 3

Acts, standards or guidelines relevant to the planning, construction, operation and maintenance of the Medupi Power Station were identified within the EIA process undertaken. Those Acts, standards or guidelines which are relevant for the operation and maintenance of the power station are summarised below.

3.1. Legislative Framework

Table 3.1 provides a summary of the national legislation relevant to the operation and maintenance of the Medupi Power Station. Due to legislation changes from time to time, the Eskom Medupi Power Station legal register, which is to be updated on a regular basis shall be referred to ensure applicability to the operations and to ensure compliance.

Table 3.1: List of applicable national legislation and compliance requirements for the operation and maintenance of the Medupi Power Station

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements	Milestones
National Environmental Management Act (Act No 107 of 1998)	In terms of the Duty of Care provision in S28(1) Eskom as the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised. In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	Department of Environmental Affairs – Legal Authorisations and Compliance Inspectorate (as regulator of NEMA).	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application throughout the life cycle of the project.	Continuous compliance
National Environmental Management: Waste Act (Act No 59 of 2008)	No person may commence, undertake or conduct a waste management activity listed in GN 718 in terms of the NEM:WA	Provincial authority (general waste) DEA (Chemicals and Waste Management)	Any waste disposal site or waste management activity associated with the operation and maintenance phase will require a Waste Management License from the competent authority	Ash dump license in place Application for pollution control dams in progress
National Environmental Management: Waste Act (Act No 59 of 2008)	Any person commencing with waste activities listed in Annexure 1 of GN R 625 in terms of NEM:WA must register on the South African Waste Information System for the generation, recovery or recycling, treatment and disposal of waste.	DEA – South African Waste Information Centre www.sawic.org.za	Registration on SAWIS within 30 days of commencement with activity and submittal of quarterly reports in accordance with Annexure 2 of GN R 625	Apply for registration of waste activities on SAWIS within 30 days of commencement of identified waste activities
Environment	National Noise Control Regulations	National Department of	There is no requirement for a	N/A

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements	Milestones
Conservation Act (Act No 73 of 1989)	(GN R154 dated 10 January 1992).	Environmental Affairs and Tourism Local authorities, i.e. Lephalale Local Municipality	noise permit in terms of the legislation. Noise standards are however required to be compiled with (refer to section 3.2.2).	
National Water Act (Act No 36 of 1998)	Section 21 sets out the water uses for which a water use license is required.	Department of Water Affairs	An Integrated Water Use License (IWUL) has been issued for Medupi Power Station (refer to Appendix B).	License expires 2029
National Water Act (Act No 36 of 1998)	In terms of Section 19, Eskom as the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.	Department of Water Affairs (as regulator of NWA)	While no permitting or licensing requirements arise directly by virtue of the project, this section will find application throughout the life cycle of the project.	Continuous compliance
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Section 22 of this Act will replace the Scheduled Processes listed under the Atmospheric Pollution Prevention Act (Act No 45 of 1965). Sections 21 and 22 provide for the listing of activities (refer below) which result in atmospheric emissions and require an Atmospheric Emissions Licence.	Limpopo Department of Economic Development, Environment and Tourism	Eskom must apply for an Atmospheric Emissions Licence for the operation of Medupi Power Station. Eskom must ensure that the conditions of the Atmospheric Emissions License are complied with at all times.	AEL obtained Appeal upheld – Eskom Medupi Power Station awaiting new license
National Environmental Management: Air Quality Act (Act No 39 of 2004)	GN 248 under the NEM:WA (gazetted 31 March 2010) establishes the listed activities and minimum emissions standards	Limpopo Department of Economic Development, Environment and Tourism	Eskom to observe compliance, monitoring and reporting requirements specified in the AEL and in accordance with GN 248	Review every 9 months after commissioning each unit

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements	Milestones
National Environmental Management: Air Quality Act (Act No 39 of 2004)	The National Ambient Air Quality Standards were gazetted on 24 December 2009 in GN 1210 specifying reference conditions, reference methods and ambient air quality measurement requirements (excluding PM2.5).	Limpopo Department of Economic Development, Environment and Tourism	The National Ambient Air Quality Standards for SO ₂ , NO ₂ , PM ₁₀ , O ₃ , C ₆ H ₆ , Pb and CO specified.	SO ₂ -immediate NO ₂ - immediate PM ₁₀ - 2014/2015 O ₃ - immediate C ₆ H ₆ - immediate/2015 Pb - immediate CO - immediate
National Environmental Management: Air Quality Act (Act No 39 of 2004)	The proposed National Ambient Air Quality Standards for PM 2.5 are contained in Notice 515.	Limpopo Department of Economic Development, Environment and Tourism	The National Ambient Air Quality Standard for PM2.5 is proposed	Refer to standard
National Environmental Management: Air Quality Act (Act No 39 of 2004)	On 8 March 2013, under correction notice GN 154, the Waterberg-Bojanala National Priority Area was declared in terms of Section 18(1) of NEM:WA	DEA	None specified	None specified
Conservation of Agricultural Resources Act (Act No 43 of 1983)	Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Weeds are described as Category 1 plants, while invader plants are described as Category 2 and Category 3 plants. These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.	Department of Agriculture	While no permitting or licensing requirements arise from this legislation, this Act finds application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, the existing weed control and management plan within the EMP must be implemented.	Continuous implementation
Conservation of Agricultural Resources Act (Act No 43 of 1983)	Regulations issued in terms of section 6 (j) in respect of burning veld.	Department of Agriculture	While no permitting or licensing requirements arise from this legislation, these	

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements	<u>Milestones</u>
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947)	In terms of this Act, a registered pest control operator will apply herbicides, or will supervise the application of herbicides.	Department of Agriculture	<p>regulations are required to be adhered to throughout the life cycle of the project.</p> <p>While no permitting or licensing requirements arise from this legislation, these regulations are required to be adhered to during the life cycle of the project. In this regard, Eskom must:</p> <ul style="list-style-type: none"> » Ensure that a registered pest control operator applies or supervises the application of all herbicides. » Ensure that all herbicides are stored in a well-ventilated demarcated storage area. » Ensure that a register of all contents of the storage area is kept and updated on a regular basis. » Ensure that a daily register of all relevant details of herbicide usage is kept, and that such a register is maintained by the relevant Eskom custodian. 	Continuous implementation
National Veld and Forest Fire Act (Act No 101 of 1998)	In terms of Section 12 Eskom would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that same does not	Department of Agriculture, Forestry and Fisheries	While no permitting or licensing requirements arise from this legislation, this Act will find application during the	Continuous implementation

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements	<u>Milestones</u>
	<p>spread to adjoining land.</p> <p>In terms of Section 13 Eskom must ensure that the firebreak is wide enough and long enough to have a reasonable chance of preventing a veldfire from spreading; not causing erosion; and is reasonably free of inflammable material.</p> <p>In terms of Section 17, Eskom must have such equipment, protective clothing and trained personnel for extinguishing fires as are prescribed or in the absence of prescribed requirements, reasonably required in the circumstances.</p>		<p>operational phase of the project.</p>	
<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p>	<p>Department of Health</p>	<p>It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the site by the activity and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.</p>	<p>Continuous implementation</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements	<u>Milestones</u>
	<p>Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance;</p> <p>Group IV: any electronic product;</p> <p>Group V: any radioactive material.</p> <p>The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>			
<p>National Road Traffic Act (Act No 93 of 1996)</p>	<p>Regulation 274 (read with SABS Code 0232 which deals with transportation of dangerous goods and emergency information systems) states that the regulations are applicable where dangerous goods are transported in quantities, which exceed the exempt quantities (listed in Annex E of SABS Code 0232). Dangerous goods may only be transported in accordance with the provisions in the Regulations, unless the Minister of Transport has granted an exemption.</p>	<p>Department of Transport Limpopo Department of Transport and Public Works (provincial roads) South African National Roads Agency (national roads)</p>	<p>Eskom will need to ensure that procedures are in place to prevent that the quantities of any dangerous goods transported exceed the prescribed quantity (listed in Annex E of SABS Code 0232). Apply for an exemption, if applicable.</p>	<p>Compliance with SANS and regulations governing transportation of dangerous goods</p>

3.2. Environmental Standards

All applicable environmental standards contained within the environmental legislation and as reflected in the relevant permits or licenses shall be adhered to. At the time of compiling this EMP, the following environmental guidelines and standards were applicable for the operation and maintenance phases of the Medupi Power Station.

3.2.1. Point source maximum emissions

On 31 July 2012 Eskom Medupi Power Station issued an appeal against certain provisions of the Provisional Atmospheric Emissions License (AEL) issued on 14 June 2012 by the Limpopo Department of Economic Development, Environment and Tourism. In its letter dated 18 July 2013, the appeal was upheld by the LDEDET subject to certain conditions being met. All conditions in this correspondence as well as the amended AEL to be issued by LDEDET are to be adhered to.

Emissions limits at Medupi will be in accordance with those specified in the regulations (Regulation No. 248 of 31 March 2010) as reflected in the AEL (appendix B).

3.2.2. Ambient Air Quality Guidelines and Standards

Air quality guidelines and standards are fundamental to effective air quality management, providing the link between the source of atmospheric emissions and the user of that air at the downstream receptor site. The ambient air quality limits are intended to indicate safe daily exposure levels for the majority of the population, including the very young and the elderly, throughout an individual's lifetime.

Current ambient air quality standards are listed in GN R 1210 as gazetted on 24 December 2009 under the National Environmental Management: Air Quality Act (Act No 39 of 2004). Eskom Medupi Power Station will be required to achieve compliance in accordance with these standards. PM_{2.5} emissions are intended to be regulated in accordance with Notice 515 of 2011 in terms of NEM:AQA.

The Medupi Power Station falls within the Waterberg-Bojanala National Priority Area, declared a priority area in terms of Section 18(1) of NEM:WA on 8 March 2013, under correction notice GN 154.

3.2.3. Water use standards

The following water uses, volumes and limits are specified in the Water Use License (License number 27086983) dated 13/02/2009 as amended on 9/03/2011, and any future water uses will be required to be consolidated and licensed before operation:

Water use	Licensed volume	Variable	Limit
Section 21 (a) – Taking water from a water resource	14 500 000 m ³ + 2 900 000 m ³ from the Mokolo Dam via the Exxaro pipeline	n/a	Daily quantity to be metered or gauged
Section 21 (b) – Storage of water	800 000 m ³ in compartment reservoir located at Farm Kuipersbult 511 LQ	n/a	800 000 m ³
Section 21 (c & i) – raw water pipeline stream crossing at farm Kuipersbult 511 LQ	n/a	n/a	n/a
Section 21 (e) – Irrigation of land with waste or water containing waste and dust suppression with treated wastewater from batching plant	730 000m ³ per annum	pH	5.5-7.5
		Electrical Conductivity	50 mS/m
		Ammonia	2mg/l
		Nitrate	15 mg/l
		Chlorine	0.25 mg/l
		Manganese	0.1 mg/l
		Chemical oxygen demand	30 mg/l
		Faecal Coliforms per 100ml	0
		Suspended solids	10 mg/l
Section 21 (f) – Discharging waste or water containing waste into a water resource	Domestic waste water – 62 000m ³ per month into the Mokolo River	pH	5.5 – 9.5
		Electrical conductivity	70 mS/m above intake to a maximum of 150 mS/m
		Nitrate	15 mg/l
		Ammonia	1.0 mg/l
		Chemical oxygen demand	75 mg/l
		Faecal coliform units	0 per 100ml
		Orthophosphate	1 mg/l
Section 21 (g) – Disposing of waste in a manner which may detrimentally impact on a water resource	Industrial waste water – 30 000m ³ per month of runoff water captured around ash disposal facility and 145 000 m ³ per annum process water into dirty stormwater dam	n/a	n/a

	Industrial waste water – 110 000m ³ per month into clean stormwater dam	n/a	n/a
	Storm water runoff from coal stockyard area into coal yard pollution control dam with storage capacity of 60 000 m ³ per annum	n/a	n/a
	Disposal of storm water runoff and seepage from ash dump into six ash dump pollution control dams	n/a	n/a
	Disposal of storm water runoff from the clean terrace of the station into a clean storm water dam with a total storage capacity of 172 000m ³ per annum	n/a	n/a
	Disposal of treated final effluent into four maturation ponds each with a storage capacity of 1700 m ³ per annum	n/a	n/a
Section 21 (j) – removing, disposal or disposing of groundwater for the efficient continuation of an activity	In the coal stock yard area as per the approved liner system design and operating procedures in document dated 10 January 2011 by SRK	n/a	n/a

3.2.4. Noise Control Regulations

Acceptable rating levels of noise for districts are indicated in Table 2 of SANS 10103 as follows:

SANS 10103, Table 3 - Acceptable rating levels of noise for districts (Medupi falls within an industrial district)

Type of district	Equivalent continuous rating level ($L_{Req,T}$) for noise, dBA					
	Outdoors			Indoors, with windows open		
	Day-night $L_{R,dn}$	Day-time $L_{Req,d}$	Night time $L_{Req,n}$	Day-night $L_{R,dn}$	Day-time $L_{Req,d}$	Night time $L_{Req,n}$
Residential Districts						
Rural districts	45	45	35	35	35	25
Suburban districts with little road traffic	50	50	40	40	40	30
Urban districts	55	55	45	45	45	35
Non-residential Districts						
Urban districts with some workshops, with business premises, and with main roads	60	60	50	50	50	40
Central business districts	65	65	55	55	55	45
Industrial districts	70	70	60	60	60	50

3.2.5. Control of Alien Vegetation

The regulations applicable in the Conservation of Agricultural Resources Act (Act No 43 of 1983) include:

» *Definitions:*

Declared weeds or alien invader plants are defined by the Conservation of Agricultural Resources Act (Act No 43 of 1983) as follows:

- * **Category 1:** Declared weeds. These species must be eradicated from all areas, and are only permitted with written permission from the Executive Officer (as defined by the Act) or in the case of a formally approved biological control reserve.
- * **Category 2:** Invader plants. These species are only permitted in specially demarcated areas and should be eradicated in all areas, except where permission has been granted. These species are not permitted to grow within 50 m of the 1:50 floodline.

A list of species defined as Category 1 and 2 is presented in Appendix D.

In terms of Government Notice R 1048, the following regulations are applicable with regards to the control of invasive alien vegetation and declared weeds:

- » It is illegal to have declared weed species or invasive alien vegetation on one's property.
- » The landowner must immediately take steps to eradicate them by using the methods prescribed in the regulations, namely:
 - * uprooting and burning, or
 - * the application of a suitable chemical weed-killer (herbicide), or
 - * any other method of permanent eradication.
- » One may not uproot or remove such plants and dump or discard them elsewhere to re-grow or to allow their seeds to be spread or blown onto other properties.
- » If the landowner does not comply with the requirements above, a person may be found guilty of a criminal offence.

The following operational control has been developed and must be complied with – Medupi alien and invasive plant species management plan (200-85677). The associated alien and invasive plants register must also be kept up to date.

MANAGEMENT PLAN FOR MEDUPI POWER STATION: OPERATION AND MAINTENANCE

CHAPTER 4

A number of potential operational impacts requiring management and mitigation were identified during the EIA. These include:

- » Impacts on air quality and human health as a result of emissions to air from the facility
- » Impacts on surface and groundwater resources as a result of the operation of the power station
- » Visual impacts
- » Noise impacts
- » Social impacts

Mitigation measures required to be implemented in order to minimise the above identified impacts were detailed within the EIA Report (Bohlweki Environmental, May 2006). Environmental specifications (i.e. principles of environmental management for the operation and maintenance of the Medupi Power Station) and procedures necessary for Eskom to achieve environmental compliance during the operation and maintenance of the Medupi Power Station are detailed within this section of the EMP.

4.1. Overall Goal for Operation

Overall Goal for Operation: To ensure that the operation and maintenance of the Medupi Power Station does not have unforeseen or avoidable 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 Medupi Power Station in a way that:

- » Ensures that operation and maintenance activities are properly managed in respect of environmental aspects and impacts.
- » Enables operation and maintenance activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to noise impacts, air quality impacts, surrounding land use practices and effects on local residents.

4.2. Institutional Arrangements: Functions and Responsibilities for the Operational Phase of the Medupi Power Station

OBJECTIVE: To establish clear reporting, communication and responsibilities in relation to an environmental incident

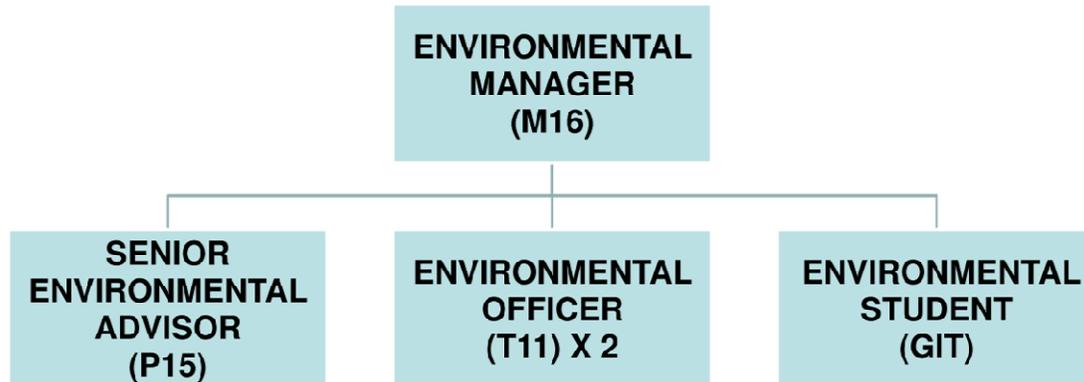
Formal responsibilities are necessary to ensure that key procedures are executed. Power Station Management will comprise of a Power Station Manager and relevant heads of technical groups and support departments. This team represents Eskom Generation on site and is committed to comply with ISO 14001 environmental practices.

Each technical group head will be responsible and accountable for environmental management within his/her area of responsibility, and will ensure that his/her department ensures compliance with the established procedures that address environmental aspects and adherence to these will minimise environmental impacts. Specific responsibilities of the Medupi Power Station Manager, Eskom Environmental Manager, and SHE Representative / Environmental Officer for the operations phase of this project are as detailed below.

The **Power Station Manager** will:

- » Identify and appoint representatives from different departments of the facility. These employees shall be assigned the role of EMP drivers and shall collectively form the Environmental Management System (EMS) management team.
- » Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation and operation of the EMS as stated in the environmental Policy.
- » Implement high level indicators to monitor the long term viability of the environment within which the EMS is operated and ensure the relevant objectives and targets programmes are achieved.
- » Conduct annual basis reviews of the EMS to evaluate its effectiveness.
- » Take appropriate action as a result of findings and recommendations in management reviews and audits.
- » Provide forums to communicate matters regarding environmental management.
- » Provide overall assurance to the MD: Generation Division (and hence ultimately the CEO) that environmental issues are appropriately addressed and managed at the various business units (i.e. power generation stations).
- » Develop and implement strategies on various issues such as Environmental Management Systems, waste management, etc.
- » Be responsible for overall consolidation and reporting of environmental performance within the Generation Division.
- » Liaise on a strategic level with Government and other stakeholders on a range of issues.

Environmental Management Structure



The **Eskom Environmental Manager** will:

- » Develop and lead the development, implementation and maintenance of environmental management systems and related procedures and processes including environmental related legislation, standards and environmental licensing / authorisation process.
- » Formulate and implement operational plans to achieve environmental management objectives and key performance indicators (KPI's), review and report on performance with the aim of initiating improvement measures.
- » Intervene to influence proposed environmental management related legislation and standards, including the influencing of licensing and permitting process, and formulate recommendations to Eskom to comply with environmental management related legislation and standards.
- » Initiate the implementation of best practice for environmental management and track implementation thereof.
- » Manage, delegate and influence engagement with stakeholders and authorities regarding environmental management and consult on strategic partnerships.
- » Management and administration of a team of environmental practitioners.

The **Senior Environmental Advisor** will:

- » Implement an Environmental Management System (EMS) for the power station and associated infrastructure.
- » Manage and report on the facility's environmental performance.
- » Maintain a register of all known environmental impacts and manage the monitoring thereof.
- » Conduct internal environmental audits and co-ordinate external environmental audits.
- » Liaise with statutory bodies such as the Department of Environmental Affairs (DEA) and the Limpopo Department of Economic Development, Environment and Tourism (DEDET) on environmental performance and other issues.

- » Conduct environmental training and awareness for the employees who operate and maintain the power station.
- » Make environmental indicators visible through the printing and distribution of posters.
- » Compile and disseminate information regarding improvement programmes to the rest of the power station, head office personnel and the public where applicable.
- » Compile environmental policies and procedures.
- » Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

A Safety Health and Environmental Committee will meet regularly as defined by the EMS. The purpose of the meeting will be to keep management updated on, *inter alia*, environmental issues and to resolve any environmental concerns.

The **Environmental officer** will:

- » Provide assistance to the Eskom Environmental Manager and Senior Environmental Advisor in undertaking the abovementioned activities.
- » Maintain and integrated Environmental Management System
- » Provide a specialist technical and scientific service
- » Perform administrative controls
- » Provide support and assistance

The **Environmental Young Professional/ Environmental Student** will:

- » Provide assistance to the Eskom Environmental Manager and Senior Environmental Advisor in undertaking the abovementioned activities including providing assistance in monitoring implementation of an integrated environmental management system and capturing and loading of environmental events and complaints.

Eskom Head Office will:

- » Undertake internal reviews
- » Facilitate external audits
- » Provide legal advice and support
- » Provide overall assurance to the MD: Generation Division (and hence ultimately the CEO) that environmental issues are appropriately addressed and managed at the various business units (i.e. power generation stations).
- » Develop and implement strategies on various issues such as Environmental Management Systems, waste management, etc.
- » Be responsible for overall consolidation and reporting of environmental performance within the Generation Division.
- » Liaise on a strategic level with Government and other stakeholders on a range of issues.

Environmental Monitoring Committee

An Environmental Monitoring Committee (EMC) is required by Condition 3.2.2 of the RoD and has been established for the construction phase of the project (known as the Medupi EMC). The terms of reference detailing the roles, responsibilities and constitution of the EMC for the operation phase shall be founded upon those established by the EMC terms of reference for the construction phase in consultation with the DEA.

For the operational phase of the project, the EMC membership will consist of:

- » A chairperson
- » The ecologist that participated in the EIA process, or any other suitably qualified and experienced ecologist approved for this purpose by the Department
- » Two representatives of the public, one community member from Maropong and one from Lephalale
- » Eskom Medupi Senior Environmental Advisor and subordinates

The EMC has the following roles and responsibilities during the operation of the Medupi Power Station:

- » The EMC must appoint an independent chairperson who has appropriate people and project management skills
- » The EMC must meet on a bi-monthly basis from the inception of the project
- » The EMC must report to the Director-General of the DDEA on a bi-monthly basis

The Purpose of the EMC is to execute the following:

- » To monitor and audit project compliance to the conditions of the RoD environmental legislation and specific mitigation requirements as stipulated in the Environmental Impact Report and the Environmental Management Plans
- » To make recommendations to the Director-General on the issues related to the monitoring and the auditing of the project
- » The EMC shall decide on the frequency of meetings should a need arise to review the prescribed frequency. This change should be communicated to DEA for acceptance.

All costs associated with the EMC shall be borne by the Eskom. The terms of reference for the EMC must, in addition to the scope of work, clearly set out roles and responsibilities related to logistical arrangements, administration and financial arrangements associated with the EMC.

4.3. 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 dust and emissions to air

Sources of impacts on air quality associated with the operation of the power station include stack emissions in addition to fugitive dust releases arising as a result of coal and ash handling, wind entrainment from the ash dump, and recovery and use of topsoil material.

Stack Emissions

Coal combusted in a power plant to produce heat for electricity generation produces two distinct products, viz. fine particulate matter (FPM) and gaseous emissions. The latter is made up of; *inter alia*, carbon dioxide, sulphur dioxide and nitrogen oxides.

Sensitive Receptors

Given that the power station will be associated with ground level emissions (e.g. from mining and ashing operations) and high level emissions (power station stacks), the Medupi Power Station has the potential of impacting on receptors in the near and medium fields.

Residential areas / sensitive receptors in the vicinity of the Medupi include the following (refer to Figure 4.1):

- » Lephallale – 19km east-north-east of Medupi
- » Onverwacht – 11km east of Medupi
- » Marapong - 7.5km north-east of Medupi

Farm households are scattered through the area, with livestock farming (primarily cattle and game) representing the main agricultural land use in the area. The closest schools and clinics include: Ellisras School, Clinic and Hospital, the Lekhureng Primary School and Weltevrede Montoma School.

Maximum air impact zone:

Particulates: the maximum impact zone is expected to be immediately downwind (west-north-west) of the ash disposal facility.

Emissions: the maximum impact zone is expected to be between 2km and 5km downwind (west-north-west) of the power station. This will be limited to within 2km from

Medupi once the FDG is operational (6 years after commissioning) due to the reduced buoyancy of the plume.

Cumulative emissions: the maximum cumulative impacts zone due to both Matimba and Medupis activities is in the zone between Matimba and Medupi (i.e. north-west of Medupi).

Eskom Generation Environmental Management has conducted an air quality study in Marapong in reference to Condition 3.2.1.4 of the RoD. Objectives of the study were:

- » To determine current levels of air pollution in Marapong.
- » To determine major sources that contribute to pollution in the area
- » Investigate the socio-economic dynamics that play a role in the quality of air in Marapong

Ambient air quality at Marapong, the nearest settlement to the Medupi project, continues to be monitored for a number parameters (such as SO₂, NO₂, Ozone, Mercury, fine particulate matter below 10 and 2.5 micron including meteorological parameters), as required by the Record of Decision issued by DEA for the Medupi project. The monitoring tests compliance with National Ambient Air quality Standards. The monitoring station is accredited by the South African National Accreditation Service (SANAS) and is included in the Schedule of Accreditation for the Air Quality Monitoring Network (SANAS No T0199). This monitoring station shows that there is little impact from Matimba and Medupi's activities on Marapong (which is expected, since Marapong is upwind of the power stations). The other populated areas, Lephalale and Onverwacht are also upwind of the power stations. The condition 3.2.1.4 in the RoD is considered to be completed, however, ambient air quality monitoring in Marapong will continue, and should a deterioration in ambient air quality be evident due to Eskom's activities, the issue should be re-looked at.

Project component/s	List of project components affecting the objective: <ul style="list-style-type: none"> » Stack emissions » Coal handling » Ash handling » Ash dumps » Topsoil use and recovery initiatives
Potential Impact	<ul style="list-style-type: none"> » Impact on air quality » Impact on human health
Activity/risk source	<ul style="list-style-type: none"> » Coal combustion » Coal and ash handling » Wind entrainment from the ash dump » Recovery and use of topsoil material
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure compliance with ambient air quality standards » To ensure compliance with the conditions and emission limits in the Atmospheric Emission Licence

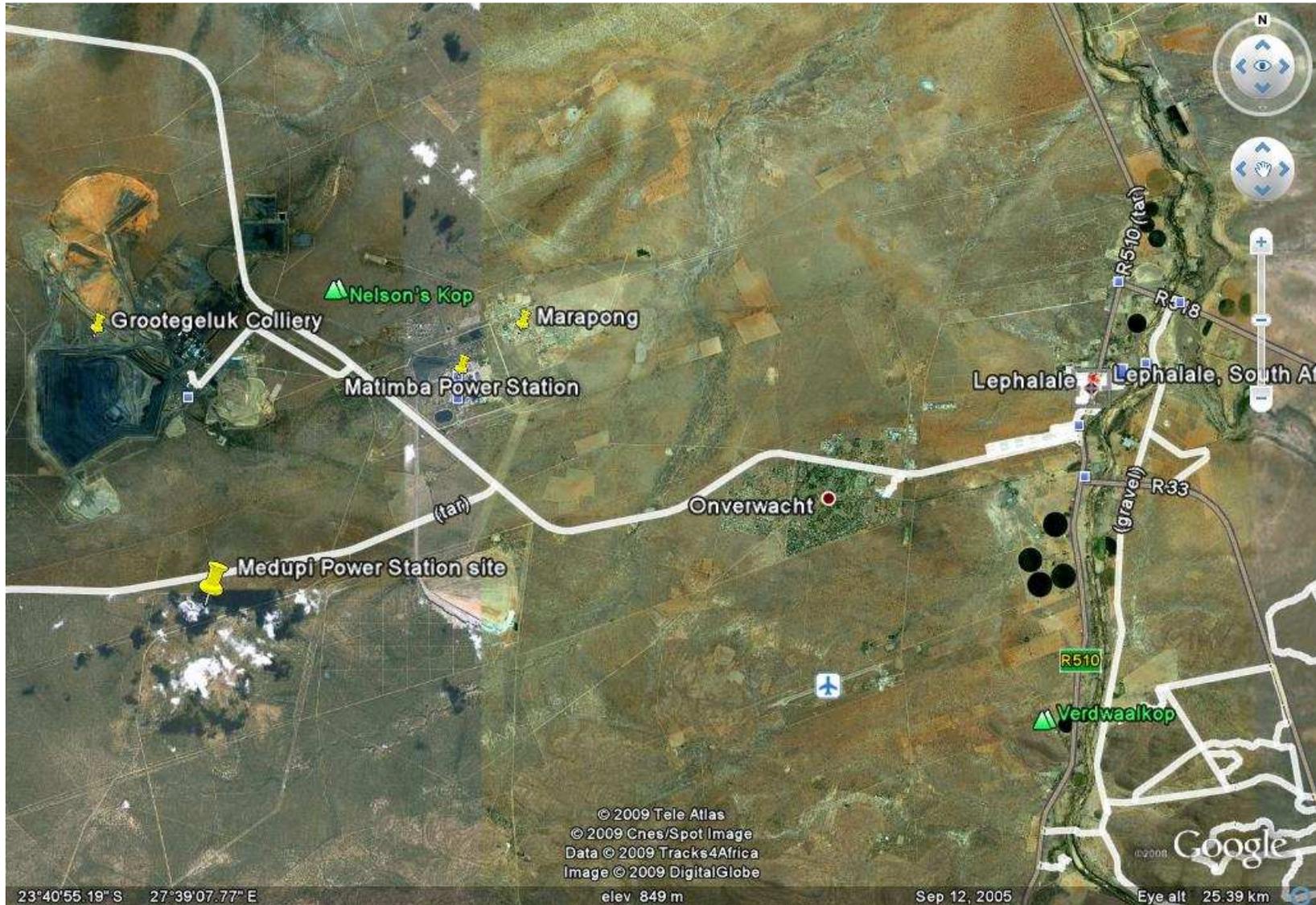


Figure 4.1: Medupi Power Station site and surrounding areas

Mitigation: Action/control	Responsibility	Milestones
<p>Obtain air emissions permit/license from CAPCO and ensure compliance with the requirements of this permit, once issued. Ensure compliance with the conditions imposed by the AEL and ensure compliance in terms thereof in accordance with Specific Condition 3.2.1.5 of the RoD.</p>	<p>Eskom Sustainability Division, Environmental Management Department Generation Environmental Management Ensure compliance: Medupi Power Station</p>	<ul style="list-style-type: none"> » Address any specific conditions applicable to the outcome of the appeal on the AEL » Appoint auditors to conduct bi-annual audits on the AEL in progress Fugitive dust management plan development in progress » Report to support pollution control from the bulk fuel tanks submitted 12 September 2013
<p>Continue with programme for the continuous monitoring of ambient concentrations of pollutants in the Marapong residential area well as areas surrounding the power station in accordance with Specific Condition 3.2.1.1 of the RoD. The programme is to provide continuous measurement of the following substances or mixtures of substances: Sulphur Dioxide (SO₂); Nitrogen Dioxide (NO₂); Particulate Matter (PM₁₀ and PM_{2.5}); Ozone (O₃); and Mercury (Hg)</p>	<p>Eskom: Generation Environmental Management and Sustainability & Innovation</p>	<p>Monitoring sites have been established in Marapong and Steenbokpan. A third monitoring site is to be identified by Eskom.</p>
<p>Install, commission and operate any required SO₂ abatement measures that may be necessary to ensure compliance with emission or ambient air quality standards published in the national Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004) – in accordance with Specific Condition 3.2.1.2 and 3.2.1.3 of the RoD.</p>	<p>Eskom: Medupi power station</p>	<ul style="list-style-type: none"> » FGD will be installed during the first General Overhaul outage, 6 years after each unit is commissioned No FGD will be installed during the first GO, only at FGD stage
<p>Investigate additional mitigation measures to further reduce sulphur dioxide emissions such as Flue Gas Desulphurisation technology.</p>	<p>Eskom: Medupi Power Station</p>	
<p>Maintain power station equipment according to industry and or regulatory standard in order to achieve required emission standards.</p>	<p>Eskom: Medupi Power Station</p>	<p>Continuous</p>
<p>Manage ash disposal areas to minimise their potential for dust pollution.</p>	<p>Eskom: Medupi Power Station</p>	<p>Continuous</p>
<p>Maintain and repair all vehicles in accordance with manufacturer / product specifications</p>	<p>Eskom: Medupi Power Station</p>	<p>Continuous</p>

Mitigation: Action/control	Responsibility	Milestones
Roads will be sealed and maintained to ensure that dust emissions are minimised.	Eskom: Medupi Power Station	Continuous
Burning of waste material such as vegetation and old cleaning materials resulting from maintenance activities at a site is strictly prohibited.	Eskom: Medupi Power Station	Continuous
In situations where firebreaks will be constructed to prevent fires spreading from the site as well as fires entering the site from adjacent land, these will be established in accordance with the National Veld and Forest Fires Act (Act No 101 of 1998).	Eskom: Medupi Power Station	Continuous
Develop and implement an air pollution management plan for the power station.	Development: Generation Environmental Management Implementation: Medupi Power Station	Air pollution management plan in progress to be completed Dec 2013
Initiate a programme of support for initiatives aimed at improving air quality in the Marapong residential area in accordance with Condition 3.2.1.4.	Eskom Sustainability Division; Environmental Management Medupi Power Station Local Municipality	Study undertaken to address condition 3.2.1.4 of the RoD An ambient air quality monitoring station is situated in Marapong. This monitoring station shows that there is little impact from Matimba and Medupi's activities on Marapong (which is expected, since Marapong is upwind of the power stations). The other populated areas, Lephalale and Onverwacht are also upwind of the power stations. The condition 3.2.1.4 in the RoD is considered to be completed, but ambient air quality monitoring in Marapong should continue, Should a deterioration in ambient air quality be evident due to Eskom's activities, the issue should be re-looked at The outcomes of this study should be captured in the
Continuous air quality monitoring is to occur in Marapong throughout operational phase. In case negative effects on air quality in Marapong caused during operation, Medupi and local municipality to initiate programme to mitigate and prevent negative impacts caused.	Medupi Power Station Local Municipality	

Mitigation: Action/control	Responsibility	Milestones
		EMP and managed accordingly

Performance Indicator	<ul style="list-style-type: none"> » Compliance with ambient air quality limits, to be evaluated using measurements collected at ambient air quality monitoring stations located in the nearby residential areas. » Compliance with conditions and emission limits stipulated in the Atmospheric Emission Licence. » No complaints from affected residents or community regarding emissions once Medupi power station is fully operational.
Monitoring	<ul style="list-style-type: none"> » Continue with the air quality monitoring programme initiated within the Marapong residential area in accordance with Condition 3.2.1.1 of the RoD » Ambient air quality (SO₂, NO_x, PM₁₀, PM_{2.5}, Hg and O₂) and meteorology is to be continuously monitored at the Marapong ambient air quality monitoring station) as per condition 3.2.1.1 of the RoD. » Continuous emission monitoring systems are to be installed on all units to measure emissions of SO₂, NO₂, CO, PM, O₃ and Hg. » In accordance with Condition 3.2.1.1, a commissioning report is to be produced by an independent party indicating that the gas sampling installations are in place, calibrated and operating to internationally acceptable standards of operation. » Quarterly reports are to be submitted to the department detailing the monitoring results, obtained from the installation detailed above. Any other monitoring results from Eskom monitoring stations in the area shall be developed. This must include both a numeric and graphical representation of measured pollutants with a comparison against any applicable ambient air quality standards published in terms of NEM:AQA Act 39 of 2004. » Fugitive dust emissions are to be monitored at all dust sources around the Medupi Power Station including the ash disposal facilities » Emissions are to be reported in accordance with the timeframes specified in the AEL. » A complaints register will be maintained, in which any complaints from residents/the community will be logged. Complaints will be investigated and, where appropriate, acted upon. » All incidents must be recorded and processed as per the Health, Safety and Environmental incident management procedure as amended. » Commission and operate any required SO₂ abatement measures in respect of the Matimba Power Station as may be necessary to ensure compliance with applicable emission or ambient air quality standards in accordance with Condition 3.2.1.3. » In accordance with Condition 3.2.1.4, Eskom has initiated a programme of support for initiatives aimed at improving air quality in the Marapong residential area. It must be ensured that the management of dust and emissions are met based on the findings of

- the programme..
- » The Medupi Power Station is to be operated in compliance with the Atmospheric Emission License in terms of NEM:AQA Act 39 of 2004

OBJECTIVE: Minimisation of impacts on surface and groundwater resources

Power Station Water Use

An Integrated Water Use License (IWUL) and Water Use License amendment 9 March 2011 has been issued by the Department of Water Affairs and Forestry for the operation of the Medupi Power Station (refer to Appendix B). Consolidation of several amendments that are triggered by changes in the design and engineering parameters for future activities will be required before operation.

The Medupi Environmental Performance Monitoring and Measurement Procedure and monitoring matrix shall be used to monitor compliance to the relevant conditions. Monitoring shall be undertaken in accordance with this procedure.

The power station requires an assured reliable water source in order to generate sufficient energy to meet its demands. The Department of Water Affairs (DWA) provides the water at an assurance of 99,5% i.e. the probability of system failure occurring only once in 200 years.

Possible Sources of Contamination that may Impact on Groundwater or Surface Water

The possible sources of contamination or infrastructure that were identified as potentially impacting on groundwater or surface water resources which were identified by Bohlweki Environmental (EIA 2006) are tabled below. Note that the absence of a surface or water pathway into the environment from the potential contamination source will present a diminished risk of pollution and environmental risk and priority should be assigned accordingly.

Infrastructure	Possible contamination source
Coal stockpiles and associated pollution control dams	Potential acid generation area
Sewage plant and dams	Irrigation of effluent may impact on groundwater
Treated (de-ionized) water system	Brine added to fly ash for deposition on ash dump
Evaporation dams (pollution control dams)	Source of "poor" quality artificial recharge
Recovery (dirty water) dams	Overflow and irrigation may impact on groundwater
Bunker fuel oil tanks	Oil enters water and requires treatment
Emergency ash dump, ash dump & ash	Potential source of leachate that will artificially recharge

Infrastructure	Possible contamination source
dump pollution control dams	groundwater
<ul style="list-style-type: none"> » Solid waste site » Central waste transfer facility » Refuelling station » Workshops » Maintenance areas 	Source of leachate or poor quality water

Project component/s	List of project components affecting the objective: <ul style="list-style-type: none"> » Coal stockpiles » Raw water dam » Sewage plant and dams » Treated (de-ionized) water system » Evaporation dams » Recovery (dirty water) dams » Bunker fuel oil » Ash dump » Ash dump toe dam » Solid waste site
Potential Impact	<ul style="list-style-type: none"> » Contamination of surface and groundwater resources
Activity/risk source	<ul style="list-style-type: none"> » Poor quality water stored on site recharging the groundwater » Solid waste site (all waste must be transported to a licensed and well managed disposal facility) » Seepage below the ash dump » Poor quality surface water on site » Sewage facilities » Fuel (bunker) oil » Surface water supply » Coal stockyard
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Ensure appropriate management and use of water resources by developing and maintaining an integrated waste and water management plan as is required by condition 12.1 of the WUL. » Minimise potential for impacts on surface and groundwater

Mitigation: Action/control	Responsibility	Milestone
Obtain an integrated water use licence application from DWA for the water uses associated with the Medupi Power Station (refer to Appendix B).	Eskom Sustainability Division, Environmental Management Department	Application for IWUL to be made to DWA once all water use information known to include future activities
Drill, construct and maintain monitoring boreholes on site. The groundwater monitoring points must include a shallow (~10 m)	Eskom Medupi Power Station /	Continuous

and a deep (~30 m) pair of monitoring boreholes. The pair of monitoring boreholes must be designed and constructed to allow sampling of the shallow weathered aquifer and the deeper fractured rock aquifers. The monitoring boreholes must be located adjacent to the potential contaminant sources and approximately 30 m to 50 m down gradient of the identified sources.	Contractor	
Undertake groundwater modelling and potential plume migration on an on-going basis to assess on-going risk reduction measures and potential impacts.	Eskom Medupi Power Station /Specialist	Continuous
Where water quality at monitoring locations is found to fall outside of the prescribed guideline levels (for surface water), the source of the deviation must be investigated and corrective measures taken immediately. For groundwater, deviations from the baseline monitoring date must be investigated and corrective measures taken immediately.	Eskom Medupi Power Station /Specialist	Continuous
In accordance with the requirements of the National Water Act, contamination or pollution of surface or groundwater must be avoided (possible pollution sources include oil, petrol, cleaning materials, herbicides, power station "dirty water" and ash, etc.).	Eskom Medupi Power Station	Continuous
All hazardous substances at the site shall be managed in accordance with the regulations under the Hazardous Substances Act as well as the Operational Control Spill Prevention, Control and countermeasures plan (200-80598) which includes a register of all hazardous substances, location, relevant controls, links to MSDS, distance to sensitive receptors and water courses/storm water channels, risk assessment per product (likelihood, frequency and significance should spill occur), etc.	Eskom Medupi Power Station / Contractor	Continuous
All waste to be disposed of at an licensed waste facility by a licensed waste management contractor/service provider.	Eskom Medupi Power Station / Contractor	Continuous
Spill kits will be made available on site for the immediate clean up of spills and leaks of contaminants at all areas where hazardous chemical substances are stored and/or used.	Eskom Medupi Power Station	Continuous
Spill response procedures to include removal/disposal of potentially contaminated materials to avoid secondary pollution of water sources. Contaminated materials to be disposed of at an appropriately licensed waste disposal site.	Eskom Medupi Power Station / Contractor	Continuous
In the event of a major spill or leak of contaminants, the administering authority will be contacted immediately as per incident reporting procedures.	Eskom Medupi Power Station / DEA, DWA	Continuous

Performance Indicator	<ul style="list-style-type: none"> » No contamination of surface and groundwater resources indicated by monitoring results. » All provisions of the National Water Act (No 36 of 1998) and the Water Use License issued in terms of this Act are adhered to.
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	<ul style="list-style-type: none">» No complaints from affected residents or community regarding water quality or quantity.
Monitoring	<ul style="list-style-type: none">» RoD condition 3.2.9.1: Eskom shall continuously monitor the ground water quality and implement measures to monitor that pollution of the resource does not occur. The Medupi Environmental Performance Monitoring and Measurement Procedure and monitoring matrix shall be used as reference. Monitoring shall be undertaken in accordance with these documents.» Surface, potable and groundwater levels and hydrochemistry are to be monitored on a quarterly basis.» Parameters to be measured include: Depth (m), pH, EC (mS/m), Al (mg/l), B (mg/l), Ba (mg/l), Be (mg/l), Br (mg/l), Ca (mg/l), Cd (mg/l), Cl (mg/l), Co (mg/l), Cr (mg/l), Cu (mg/l), F (mg/l), Fe (mg/l), K (mg/l), Li (mg/l), Mg (mg/l), Mn (mg/l), Mo (mg/l), Na (mg/l), Ni (mg/l), NO₂ (as N), NO₃ (as N), Pb (mg/l), PO₄ (mg/l), Se (mg/l), SO₄ (mg/l), Sr (mg/l), V (mg/l), Zn (mg/l)

OBJECTIVE: Minimisation of visual impacts

Sources of visual impact associated with the power station include the power station infrastructure as well as lighting which may be associated with the power station operation.

The power station will be similar to the existing Matimba Power Station in terms of operations, design and dimensions. The structure's dimensions include: two smoke stacks (a maximum of 220 m high) and a core power station building that is 130 m high and approximately 500 m wide. The ash dump will be approximately 45 m to 50 m high, about 2 000 m long and 600 m wide. Ancillary infrastructure which will also pose a visual impact include the coal and ash conveyor systems.

Project component/s	List of project components affecting the objective: » Smoke stacks » Power station building » Ash dams » Coal stockpiles » Conveyor Belts
Potential Impact	» Visual intrusion on surrounding areas
Activity/risk source	» Size/scale of power station stacks (~250 m in height) and building (~130 m in height) » Size/scale of ash dams » Associated lighting » Conveyor systems
Mitigation: Target/Objective	» To minimise potential for visual impact » Minimise contrast with surrounding environment and visibility of the power station

Mitigation: Action/control	Responsibility	Milestone
Ensure careful planning and sensitive placement of any light fixtures throughout the operational phase of the power station, and ensure the fitment of covers and shields designed to contain, rather than spread the light.	Eskom Medupi Power Station / Lighting Engineer	Design measures in place
Periodic adjustment of lighting shields or covers to compensate for the movement of the ash stacker.	Eskom Medupi Power Station / Lighting Engineer	Continuous
Ensure timely maintenance of the power station, ancillary infrastructure and the general surrounds of the property (buildings, gardens, access roads, lighting equipment etc.) in order to prevent the visual impact of degradation and	Eskom Medupi Power Station / Lighting Engineer	Continuous implementation

Mitigation: Action/control	Responsibility	Milestone
perceived poor management.		
Use of overtly contrasting and bright colours will be avoided when painting the cladding of the power station during refurbishment. Natural hues that complement the natural environment (i.e. light sky blue where the facility is seen against the skyline or pale green where it is seen against vegetation cover) will be used.	Eskom Medupi Power Station	Refurbishment
Any removal of natural vegetation associated with the operation and maintenance activities will be limited to the bare minimum and should not be undertaken without proper planning and delineation to ensure the footprint is minimised. Ensure that relevant vegetation removal permits are sought prior to clearing activities taking place and where possible, re-use stripped vegetation for rehabilitation purposes on the ash dump. Where feasible, trees should be transplanted around the perimeter of the site to assist with minimising the visual impact.	Eskom Medupi Power Station	Operation and maintenance

Performance Indicator	<ul style="list-style-type: none"> » Minimised visual intrusion on surrounding areas. » Minimised visual impact associated with lighting of the power station.
Monitoring	<ul style="list-style-type: none"> » Ensure that adequate safety lighting is installed and is functional at all times.

OBJECTIVE: Maintain the operational noise levels of the power station within acceptable levels and minimise the impact on staff, neighbours, residential areas and communities

Sources of noise associated with the power station (as identified through the EIA) include the power station itself, the associated conveyor systems, the ash dump spreader operations and traffic associated with the operation of the power station.

Sensitive Receptors

Existing residential areas in the study area have been defined as noise sensitive land uses. These areas include:

- » Town of Lephalale. The nearest section of the town to the study area namely Onverwacht Township lies approximately 15 km to the east of the Medupi Power Station.
- » Marapong Township, which lies 8,5 km to the north-east of the Medupi Power Station.

- » Several farmhouses and farm labourer houses located throughout the area surrounding the power station.

Project component/s	List of project components affecting the objective: » Cooling fans » Pressure release when a unit trips » Coal silo and conveyor belt systems » Ash dump spreader operations » Operational traffic » Sewage works serving power station
Potential Impact	» Increased noise levels in the surrounding areas, noise nuisance and sleep disturbance of the affected communities
Activity/risk source	» Power station components (as listed above)
Mitigation: Target/Objective	» To minimise noise levels generated by the facility as far as possible » To minimise impacts on identified noise sensitive areas

Mitigation: Action/control	Responsibility	Milestones
Ensure that all the necessary acoustic design aspects required are installed and maintained in order that the overall generated noise level from the new installation does not exceed a noise level of 70dBA (just inside the property boundary).	Eskom Medupi Power Station	Refurbishment
The latest technology incorporating maximum noise mitigating measures for the power station components should be implemented into the system.	Eskom Medupi Power Station	Operation
The design process is to consider, inter alia, the following aspects in the case of refurbishment, modification and expansion: * The position and orientation of buildings on the site. * The design of the buildings to minimise the transmission of noise from the inside to the outdoors. * The insulation of particularly noisy new plant and equipment.	Eskom Medupi Power Station	Operation, refurbishment, expansion
Farm labourer houses affected should be relocated, unless these are no longer required or uninhabited.	Eskom Medupi Power Station / Eskom Property Management	Operation
Maintain power station equipment according to industry standard.	Eskom Medupi Power Station	Operation and maintenance
Use the National Noise Control Regulations and SANS 10103 as the main guidelines for addressing the potential noise impact associated with the operation of the power station.	Eskom Medupi Power Station	Operation
Undertake routine assessments of ambient noise levels to confirm if adherence to ambient noise monitoring	Eskom/ Approved	Continuous compliance

Mitigation: Action/control	Responsibility	Milestones
programme is in place.	Inspection Authority	

Performance Indicator	<ul style="list-style-type: none"> » No complaints from residents of surrounding areas. » A Complaints register should be kept on site.
Monitoring	<ul style="list-style-type: none"> » Undertake routine assessments of noise levels to confirm if adherence to SANS guidelines is being met.

OBJECTIVE: Maintenance of power station property

In order to ensure the long-term environmental integrity of the site following construction, maintenance of the power station property (including all areas rehabilitated post-construction) must be undertaken.

Project component/s	<p>List of project components affecting the objective:</p> <ul style="list-style-type: none"> » Power station property (including access roads, fences and access control points) » Areas rehabilitated post-construction
Potential Impact	<ul style="list-style-type: none"> » Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention
Activity/risk source	<ul style="list-style-type: none"> » Power station property » Areas disturbed during construction
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that power station property is maintained such that environmental integrity and quality is ensured » To ensure and encourage site rehabilitation of disturbed areas » To ensure control of invasive plant species and weeds in accordance with Condition 3.2.7.2 of the RoD

Mitigation: Action/control	Responsibility	Milestone
Clearly demarcate the boundaries of the Eskom and all control zones site to ensure that the whole site is maintained throughout the operational phase as captured in the EMS.	Eskom Medupi Power Station	Operation and maintenance
Protected or endangered flora and fauna occurring on Eskom sites and servitudes shall be identified and protected from Eskom's activities or plant. Permits shall be obtained from the relevant authority for the clearing of protected plants.	Eskom Medupi Power Station	Operation and maintenance
A site rehabilitation and landscaping program will be implemented. Indigenous plants will be used in landscaping and rehabilitation activities.	Eskom Medupi Power Station	Operation and maintenance
Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the	Eskom Medupi Power Station	Operation and

Mitigation: Action/control	Responsibility	Milestone
agricultural resources and soil conservation works will be addressed on a continual basis, through an alien vegetation control and monitoring programme.		maintenance
<p>An alien control and monitoring programme has been developed and implemented. The following elements will be included in such a programme:</p> <ul style="list-style-type: none"> » The active control of all alien invasive species by means of manual removal, ring-barking, chemical control or a combination of these methods. » The control and eradication of undesirable seed » The bigger trunks and branches will be removed while the smaller branches can be used as a soil stabiliser against wind erosion in exposed areas, while providing micro-habitat for seedling establishment. » Rehabilitation of the cleared areas, starting with the establishment of a grass cover and phasing in the re-establishment of indigenous species by sowing in of smoked treated seed or pre-emerged seed. » All emergent seedlings will be removed by hand and re-sprouting from existing rootstock will be appropriately treated in a continual monitoring and follow-up programme. 	Eskom Medupi Power Station/ Specialist	Operation and maintenance
The legal requirements in terms of herbicide usage will be adhered to. Herbicide usage shall be recorded and monitored in order to manage and control the damage to vegetation and associated areas.	Eskom Medupi Power Station	Operation and maintenance
A botanist familiar with the vegetation (or ecologist who undertook the specialists studies) of the area should monitor the rehabilitation success of areas disturbed by construction on an annual basis, and make recommendations on how to improve any problem areas. Vegetation will be replanted in areas where vegetation cover has decreased due to dieback, or has failed otherwise to successfully establish.	Eskom/ Specialist	Operation and maintenance
Access roads, rehabilitated areas and site ground shall be monitored for deterioration and possible erosion. Soil erosion shall be prevented at all times. Proactive measures shall be implemented to curb erosion and to rehabilitate eroded areas.	Eskom	Operation and maintenance
No fires shall be made for waste destruction. Firebreaks shall be constructed to prevent fires from spreading from or into the site. Regulations in respect of veld burning issued under the Conservation of Agricultural Resources Act (Act No 43 of 1983) section 6 (j) shall be adhered to. These shall align with the Forest Act (Act No 122 of 1984) and the National Veld and Forest Fires Act (Act No 101 of 1998).	Eskom	Operation and maintenance

Performance Indicator

- » Power station property maintained in a good condition.
- » No soil erosion.

	<ul style="list-style-type: none"> » Successful rehabilitation of disturbed areas. » No alien or invader plant species located on the power station property.
Monitoring	<ul style="list-style-type: none"> » Monitoring and management of alien and invasive species on the property. » Monitoring of plant growth in rehabilitated areas will be conducted on a weekly basis during initial phases and on a monthly basis when plants have become firmly established.

OBJECTIVE: Appropriate handling and management of hazardous substances and waste

The operation and maintenance of the power station will involve the generation of limited waste products. The main wastes expected to be generated by the operation and maintenance activities include:

- » general solid waste
- » hazardous waste
- » liquid waste including sewage

Project component/s	List of project components affecting the objective: <ul style="list-style-type: none"> » Power station and associated infrastructure
Potential Impact	<ul style="list-style-type: none"> » Inefficient use of resources resulting in excessive waste generation » Litter or contamination of the site or water through poor waste management and hazardous substance handling practices
Activity/risk source	<ul style="list-style-type: none"> » Office and workshop facilities at the power station » Fuel and oil storage » Ash dump » Pollution control dams
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To comply with waste management guidelines » To minimise production of waste » To ensure appropriate waste disposal » To avoid environmental harm from waste disposal » To ensure that the transportation and handling of hazardous substances complies with the provisions of the Hazardous Substances Act (Act 15 of 1973), associated regulations as well as SABS 0228 and SABS 0229 codes.

Mitigation: Action/control	Responsibility
Waste streams will be separated at source as per the power station waste management plan and license conditions where applicable (i.e. general from hazardous waste) and stored in appropriate waste disposal containers.	Eskom Medupi Power Station

Mitigation: Action/control	Responsibility
General waste will be recycled or sold to a recycling merchant, where possible, or disposed of at an appropriately licensed waste disposal facility.	Eskom/waste management contractor
Hazardous waste (including hydrocarbons) will be stored in bunded facilities and disposed of separately.	Eskom/waste management contractor
Hazardous substances will be stored in sealed containers within a clearly demarcated designated area.	Eskom Medupi Power Station
Storage areas for hazardous substances will be appropriately sealed and bunded. MSDS's must be available at the point of use.	Eskom Medupi Power Station
All structures and/or components replaced during maintenance activities will be disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	Eskom Medupi Power Station
Ensure that the transportation and handling of hazardous substances complies with the provisions of the Hazardous Substances Act (Act 15 of 1973), associated regulations as well as SABS 0228 and SABS 0229 codes in accordance with Condition 3.2.6.2.	Eskom Medupi Power Station
Care will be taken to ensure that spillage of oils and other hazardous substances are prevented during maintenance. Handling of these materials will be undertaken where relevant within an appropriately sealed and bunded area. Should any accidental spillage take place, cleanup action will be determine by volumes and licensing parameters.	Eskom Medupi Power Station
Waste handling, collection and disposal operations will be managed and controlled by a competent and licensed waste management contractor/service provider.	Eskom/waste management contractor
Wastewater: Water from bunds and oily water from oil/water separator or sumps will be removed by a licensed contractor.	Eskom/waste contractor
Oil and water separator must effectively remove oil from water so that only oil is removed from site by contractor.	Eskom
Used oils and chemicals: <ul style="list-style-type: none"> » Appropriate disposal/recycling shall be arranged with a licensed facility in consultation with the administering authority. » Waste will be stored, handled, recycled and or disposed of according to the relevant legislation and regulations. 	Eskom/waste management contractor

Performance Indicator	<ul style="list-style-type: none"> » Number of incidents » No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits identifying that waste segregation recycling and reuse is occurring appropriately. » Audit findings related to the management of hazardous chemical substances » Provision of all appropriate waste manifests.
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Monitoring	<ul style="list-style-type: none"> » Waste collection will be monitored on a regular basis. » Waste documentation will be completed and available for inspection on request. » An incidents/complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » Regular reports on exact quantities of all waste streams exiting the site will be compiled by the waste management contractor and monitored by the Environmental Officer. » Ensure that waste disposal certificates are available for reporting purposes as and when required. » The transportation and handling of hazardous substances must comply with all the provisions of the Hazardous Substances Act (Act 15 of 1973), associated regulations as well as SANS 10228.
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OBJECTIVE: Effective management and communication with affected communities

The process of communication and consultation with the community representatives must be maintained throughout the operation and maintenance phase of the power station through the Environmental Monitoring Committee (Refer to Section 4.2 which governs the roles and responsibilities of the EMC).

Project component/s	List of project components affecting the objective: » Power station and associated infrastructure
Potential Impact	» Community opposition and/or attitude formation towards the operation of the power station
Activity/risk source	» Power station operation
Mitigation: Target/Objective	» To ensure the on-going effective management and communication with affected communities

Mitigation: Action/control	Responsibility	Milestone
A list of the neighbouring properties, property owners' names, addresses, and telephone numbers, and land use will be drawn up. This will be kept on site and updated on a continuous basis in order to ensure effective channels of communication.	EMC administrator	Before commissioning
A controlled version of the Medupi Power Station Emergency Preparedness and Response Procedure will be provided to neighbouring property owners and relevant authorities to include emergency telephone numbers and emergency procedures to be followed	Eskom Medupi Power Station	Before commissioning

Mitigation: Action/control	Responsibility	Milestone
Removal (pilfering) of agricultural products and poaching on surrounding properties are prohibited.	Eskom Medupi Power Station	Security in place on surrounding farms at Medupi Power Station
All contractors required to undertake maintenance and/or construction works must be bound contractually to comply with the Medupi EMS, EA's and the EMP (the services of contractors with proven track records of sound environmental performance shall be used).	Eskom Medupi Power Station	Operation
Ensure continuation of practice whereby complaint forms are provided through the Medupi Central Information Office and various satellite offices in surrounding communities	EMC administrator.	Operation

Performance Indicator	» Number of complaints
Monitoring	» An incidents/complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon.

**APPENDIX A:
SITE LAYOUT PLAN**

**APPENDIX B:
ENVIRONMENTAL AUTHORISATIONS**

**APPENDIX C:
ESKOM'S OPERATIONAL SPECIFICATIONS**

**APPENDIX D:
PLANT SPECIES DEFINED AS CATEGORY 1 AND 2 IN TERMS
OF THE CONSERVATION OF AGRICULTURAL RESOURCES ACT
(ACT NO 43 OF 1983)**