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# KUSILE POWER STATION, MPUMALANGA PROVINCE

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## ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR OPERATION AND MAINTENANCE

July 2009

*Prepared for*

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## PROJECT DETAILS

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**Title** : Environmental Management Plan for Operation and Maintenance of the Kusile Power Station, Mpumalanga Province

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## DEFINITIONS AND TERMINOLOGY

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**Airshed:** An airshed is a part of the atmosphere that behaves in a coherent way with respect to the dispersion of emissions. It typically forms an analytical or management unit and is also a geographic boundary for air quality standards.

**Ash Dump:** The ash that is created from the burning of coal 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.

**Base Load:** Base load refers to the electricity generated to meet the continuous need for electricity at any hour of the day or night at all times and during all seasons.

**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 construction 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.

**Environmental Impact Assessment (EIA):** A study of the environmental consequences of a proposed course of action.

**Environmental Impact Report (EIR):** A report assessing the potential significant impacts as identified during the Scoping phase.

**Flue Gas Desulphurisation (FGD):** The process of removing sulphur oxides, primarily SO<sub>2</sub>, from the combustion gases.

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

**Gaseous Emissions:** The elements / compounds that make up the emissions from the power station stacks in their vapour phase, e.g. carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>).

**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.

**Mothballed:** Deactivating a power station for an indefinite period.

**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.

**Peaking or Peak Load:** Peaking refers to the periods between 07:00 and 09:00 in the mornings and 18:00 and 20:00 in the evenings when electricity use “peaks”.

**Public Participation Process:** A process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development.

**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.

**Red Data Book (South African):** An inventory of rare, endangered, threatened or vulnerable species of South African plants and animals.

**Scoping:** A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail.

**Scoping Report:** A report describing the issues identified.

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## OVERVIEW OF THE PROJECT

## CHAPTER 1

---

The Kusile Power Station and its associated infrastructure is located in the Witbank area of the Mpumalanga Province on approximately 2 500 ha of land on the Farm Hartbeesfontein 537 JR and the Farm Klipfontein 566 JR A site layout plan is included within Appendix A. The power station is located in close proximity to the existing Kendal Power Station.

The power station itself would comprise six boiler/ turbine sets with a nominal electricity generation capacity of approximately 5 400 MW (900 MW per unit). The project would include the following infrastructure:

- » Power Station Precinct:
  - Power station buildings themselves;
  - Administrative buildings (control buildings, medical, security etc.); and
  - High voltage yard.
  
- » Associated Infrastructure:
  - Coal stock yard;
  - Coal and ash conveyors;
  - Water supply pipelines (temporary and permanent);
  - Electricity supply (temporary, during construction);
  - Water and wastewater treatment facilities;
  - Ash disposal systems;
  - Access roads (including haul roads);
  - Dams for water storage; and
  - Railway siding and/or line for sorbent supply.

Kusile Power Station is to be operated as a pulverised fuel power station utilising direct dry-cooled technology. In terms of sulphur dioxide emissions, wet flue gas desulphurisation (FGD) with at least 90% efficiency will be implemented. When fully operational, the power station is to operate under Eskom's Zero Liquid Effluent Discharge policy and accordingly no water or effluent will be discharged into the local river systems. Above-ground ash dumping will be employed as the preferred ash disposal method.

The power station is to be fuelled by coal, supplied from a new colliery in the vicinity of the power station. Coal would be transported via conveyor belts from the colliery to the coal stockyard, where it is to be stockpiled.



## PURPOSE & OBJECTIVES OF THE EMP

## CHAPTER 2

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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. The EMP is a dynamic document which must be updated on an on-going basis as the project develops.

### 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 Kusile 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 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 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 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 were not considered in the EIA process.

The EMP has been developed as a set of environmental specifications (i.e. principles of environmental management for the operation and maintenance of the Kusile 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 and associated infrastructure in the Witbank area, Mpumalanga Province (Ninham Shand, October 2006).
- » Final Environmental Impact Report for the proposed new coal- fired power station and associated infrastructure in the Witbank area (Ninham Shand, February 2007)
- » Environmental Authorisations (refer to Appendix B), including:
  - \* Record of Decision for the Construction of the Eskom Generation proposed 5 400 MW Coal-Fired Power Station, Witbank area, issued on 5 June 2007 by the National Department of Environmental Affairs and Tourism
  - \* Revised Record of Decision for the Construction of the Eskom Generation proposed 5 400 MW Coal-Fired Power Station, Witbank area, issued on 17 March 2008 by the National Department of Environmental Affairs and Tourism
- » Generation Primary Energy Division Primary Energy (water); Kusile power station technical report.
- » Eskom's operational specifications (refer to Appendix C).

In compiling this EMP, cognisance has been taken of the conditions of the environmental authorisations obtained for the Kusile Power Station and associated infrastructure (refer to Appendix B). In addition, this EMP for operation and maintenance activities has been compiled in accordance with Section 34 of the EIA Regulations and will be supported by requirements to be detailed by the project safety, health, environment and quality (SHEQ) officer. 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.

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.

### 2.3. Structure of the EMP

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

This section sets out the procedures necessary for Eskom to achieve environmental compliance during the operation and maintenance of the Kusile 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

|                                     |   |
|-------------------------------------|---|
| <b>Project component/s</b>          | List of project components affecting the objective                                  |
| <b>Potential Impact</b>             | Brief description of potential environmental impact if objective is not met         |
| <b>Activity/risk source</b>         | Description of activities which could impact on achieving the objective             |
| <b>Mitigation: Target/Objective</b> | Description of the target; include quantitative measures and/or dates of completion |

|   |                                     |
|---|-------------------------------------|
| <b>Mitigation: Action/control</b>   | <b>Responsibility</b>               |
| List specific action(s) required to meet the mitigation target/objective described above. | Who is responsible for the measures |

|                              |  |
|------------------------------|--|
| <b>Performance Indicator</b> | Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.   |
| <b>Monitoring</b>            | 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 |

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## **ENVIRONMENTAL GUIDELINES, LEGISLATION AND STANDARDS**

## **CHAPTER 3**

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Acts, standards or guidelines relevant to the planning, construction, operation and maintenance of the Kusile 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 Kusile Power Station.

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

| Legislation  | Applicable Requirements  | Relevant Authority  | Compliance requirements  |
|--|--|---|--|
| 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.<br><br>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 and Tourism (as regulator of NEMA).   | While <b>no permitting or licensing requirements</b> arise directly by virtue of the proposed project, this section will find application throughout the life cycle of the project.  |
| Environment Conservation Act (Act No 73 of 1989)           | Section 20(1) provides that where an operation accumulates, treats, stores or disposes of waste on site for a continuous period, it must apply for a permit to be classified as a suitable waste disposal facility.  | National Department of Environmental Affairs and Tourism<br><br>Department of Water Affairs and Forestry.           | Any waste disposal site associated with the proposed project will require an appropriate <b>permit from DEA</b> .  |
| Environment Conservation Act (Act No 73 of 1989)           | National Noise Control Regulations (GN R154 dated 10 January 1992)<br><br>Gauteng Noise Control Regulations (GN 5479 dated 20 August 1999)   | National Department of Environmental Affairs and Tourism<br><br>Local authorities, i.e. Kungwini Local Municipality | There is <b>no requirement for a noise permit</b> 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 and Forestry  | Eskom applied for a water use licence for the following water uses in order to allow construction to proceed:<br><ul style="list-style-type: none"> <li>» (b) storage of water in the raw water reservoir;</li> <li>» (c) impeding or diverting the flow of water in a watercourse and (i) altering the bed, banks, course or characteristics of a watercourse – an</li> </ul> |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements   |
|-------------|-------------------------|--------------------|---|
|             |                         |                    | <p>unnamed first order tributary of the Klipfonteinspruit will be diverted around the coal stockyard;</p> <ul style="list-style-type: none"> <li>» (j) removal of water found underground if it is necessary for the safe continuation of an activity, or for the safety of people – it is necessary to dewater the local perched and deeper aquifer in order to allow construction of the terraces for the power island and coal stockyard. This will also serve to prevent ingress of groundwater to the coal stockyard;</li> <li>» (i) altering the bed, banks, course or characteristics of a watercourse – raw water pipeline river crossings.</li> </ul> <p>The Department of Water Affairs (DWA) authorised these water uses in licence 27/2/2/B620/101/8 issued on 10 September 2008 (refer to Appendix B).</p> <p>Eskom is now applying for the following water uses for the construction and operational phases:</p> <ul style="list-style-type: none"> <li>» (a) taking water from a resource – 12 Mm<sup>3</sup> per annum of raw water will be piped to the power station from the VRESAP pipeline via Kendal Power Station;</li> <li>» (e) engaging in a controlled activity</li> </ul> |

| Legislation                            | Applicable Requirements  | Relevant Authority   | Compliance requirements  |
|--|--|--|--|
|  |  |  | <ul style="list-style-type: none"> <li>- re-injection of water removed from underground during construction and the operational phase; and during the operational phase, contaminated water will be used to irrigate the ash/gypsum dump to control dust;</li> <li>» (g) disposing of waste or water containing waste in any manner that may detrimentally impact on a water resource – this will include the ash/gypsum dump, coal stockyard, emergency ashing area and various pollution control dams</li> <li>» (i) altering the bed, banks, course or characteristics of a watercourse – river crossings for linear infrastructure such as conveyors, roads, rail and pipelines;</li> <li>» (j) removal of water found underground if it is necessary for the safe continuation of an activity, or for the safety of people – dewatering will need to continue into the operational phase in order to keep the terrace foundations dry.</li> </ul> |
| 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 and Forestry (as regulator of NWA) | While <b>no permitting or licensing requirements</b> arise directly by virtue of the proposed project, this section will find application throughout the life cycle of the project.  |
| National Environmental                 | Section 22 of this Act will replace the Scheduled  | Unclear whether the licensing                                  | Eskom must <b>apply for an Atmospheric</b>   |

| Legislation  | Applicable Requirements   | Relevant Authority   | Compliance requirements   |
|--|---|--|---|
| Management: Air Quality Act (Act No 39 of 2004)                | Processes listed under the Atmospheric Pollution Prevention Act (Act No 45 of 1965). Sections 21 and 22 provide for the listing of activities which result in atmospheric emissions and require an Atmospheric Emissions Licence.   | authority will be local government (Kungwini Local Municipality), provincial government (Mpumalanga) or National Government (most likely provincial government). | <b>Emissions Licence</b> for the operation of Kusile Power Station. Eskom must ensure that the conditions in the license are complied with at all times.  |
| National Heritage Act (Act No 25 of 1999)                      | Section 38(1) of the Act states that if heritage considerations are taken into account as part of an application process undertaken in terms of the ECA, there is no need to undertake a separate application in terms of the National Heritage Resources Act. The requirements of the National Heritage Resources Act have thus been addressed as an element of the EIA process, specifically by the inclusion of a Heritage Assessment. | Department of Environmental Affairs and Tourism  | The Gauteng and Mpumalanga Heritage Resource Agencies have been provided with all relevant documentation, since they have a statutory role to play in the decision-making process, acting as commenting authorities.  |
| 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 <b>no permitting or licensing requirements</b> 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. |
| 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 <b>no permitting or licensing requirements</b> arise from this legislation, these regulations are required to be adhered to throughout the  |



| Legislation  | Applicable Requirements  | Relevant Authority                              | Compliance requirements   |
|--|--|---|---|
| <p>Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947)</p> | <p>In terms of this Act, a registered pest control operator will apply herbicides, or will supervise the application of herbicides.</p>  | <p>Department of Agriculture</p>                | <p>life cycle of the project.</p> <p>While <b>no permitting or licensing requirements</b> 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"> <li>» Ensure that a registered pest control operator applies or supervises the application of all herbicides.</li> <li>» Ensure that all herbicides are stored in a well-ventilated demarcated storage area.</li> <li>» Ensure that a register of all contents of the storage area is kept and updated on a regular basis.</li> <li>» 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.</li> </ul> |
| <p>National Veld and Forest Fire Act (Act No 101 of 1998)</p>                                | <p>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 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</p> | <p>Department of Water Affairs and Forestry</p> | <p>While <b>no permitting or licensing requirements</b> arise from this legislation, this Act will find application during the operational phase of the project.</p>  |

| Legislation   | Applicable Requirements  | Relevant Authority             | Compliance requirements  |
|---|--|--------------------------------|--|
|   | <p>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>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>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>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 <b>license</b> is required to be obtained from the Department of Health.</p> |
| <p>National Road Traffic Act</p>                    | <p>Regulation 274 (read with SABS Code 0232</p>  | <p>Department of Transport</p> | <p>Eskom will need to ensure that</p>  |

| Legislation  | Applicable Requirements  | Relevant Authority  | Compliance requirements  |
|--|--|---|--|
| (Act No 93 of 1996)  | 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. | Limpopo Department of Transport and Public Works (provincial roads)<br><br>South African National Roads Agency (national roads) | <b>procedures</b> are in place <b>to prevent that the quantities of any dangerous goods transported exceed the prescribed quantity</b> (listed in Annex E of SABS Code 0232). Apply for an exemption, if applicable. |
| The Minerals and Petroleum Resources Development Act (No 28 of 2002) | The sourcing of material for road construction purposes (i.e. the use of borrow pits) is regarded as mining and accordingly is subject to the requirements of the Act.   | Department of Minerals and Energy and Department of Environmental Affairs and Tourism   | In terms of the current project, Section 106(3) provides exemption from the Act, if the landowner or lawful occupier is utilising the material to affect changes on the property, and is not selling the material.   |
| Development Facilitation Act (No 67 of 1995):                        | This Act sets the overall framework and administrative structures for planning throughout the country.   | National Department of Minerals and Energy and Mpumalanga Department of Agriculture and Land Administration                     | Eskom will require a <b>rezoning</b> of the land from agricultural to industrial zoning.   |

### 3.2. Environmental Standards

All applicable environmental standards contained within the environmental legislation 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 Kusile Power Station.

#### 3.2.1. 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 as listed in Schedule 2 of the National Environmental Management: Air Quality Act (Act No 39 of 2004). The standards that Eskom will be required to comply with for the operation of the Kusile Power Station are those that will be gazetted in September 2009. These standards are currently being formulated by the SABS process<sup>1</sup>.

#### 3.2.2. Noise Control Regulations

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

**SANS 10103, Table 2 - Acceptable rating levels of noise for districts**

| Type of district   | Equivalent continuous rating level ( $L_{Req,T}$ ) for noise, dBA |                         |                           |                            |                         |                           |
|--|---|-------------------------|---------------------------|----------------------------|-------------------------|---------------------------|
|  | Outdoors  |                         |                           | Indoors, with windows open |                         |                           |
|  | Day-night<br>$L_{R,dn}$   | Day-time<br>$L_{Req,d}$ | Night time<br>$L_{Req,n}$ | Day-night<br>$L_{R,dn}$    | Day-time<br>$L_{Req,d}$ | Night time<br>$L_{Req,n}$ |
| <b>Residential Districts</b>   |   |                         |                           |                            |                         |                           |
| 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                        |
| <b>Non-residential Districts</b>   |   |                         |                           |                            |                         |                           |
| Urban districts with some workshops, with business premises, and with main roads | 60  | 60                      | 50                        | 50                         | 50                      | 40                        |

<sup>1</sup> This section of the EMP must be updated once the air quality standards are gazetted.

| Type of district           | Equivalent continuous rating level ( $L_{Req,T}$ ) for noise, dBA |                         |                           |                            |                         |                           |
|----------------------------|---|-------------------------|---------------------------|----------------------------|-------------------------|---------------------------|
|                            | Outdoors  |                         |                           | Indoors, with windows open |                         |                           |
|                            | Day-night<br>$L_{R,dn}$   | Day-time<br>$L_{Req,d}$ | Night time<br>$L_{Req,n}$ | Day-night<br>$L_{R,dn}$    | Day-time<br>$L_{Req,d}$ | Night time<br>$L_{Req,n}$ |
| Central business districts | 65  | 65                      | 55                        | 55                         | 55                      | 45                        |
| Industrial districts       | 70  | 70                      | 60                        | 60                         | 60                      | 50                        |

### 3.2.3. 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.

## MANAGEMENT PLAN FOR KUSILE POWER STATION: OPERATION AND MAINTENANCE

## CHAPTER 4

No environmental fatal flaws were identified through the EIA process to be associated with the operation and maintenance of the Kusile Power Station. However, a number of potential impacts requiring management and mitigation during the operational phase of the power station were identified. 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 (Ninham Shand, February 2007). Environmental specifications (i.e. principles of environmental management for the operation and maintenance of the Kusile Power Station) and procedures necessary for Eskom to achieve environmental compliance during the operation and maintenance of the Kusile 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 Kusile 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 Kusile 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 Kusile 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. 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 has procedures in place that address environmental aspects and adherence to these will minimise environmental impacts. Specific responsibilities of the Generation Environmental Manager, Power Station Manager, and SHE Representative/Environmental Officer for the operations phase of this project are as detailed below.

The **Generation Environmental Manager** will:

- » 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.

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.
- » Implement high level indicators to monitor the long term viability of the environment within which the EMS is operated.
- » 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.

The **Environmental Practitioner** 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 Mpumalanga Department of Agriculture and Land Affairs (M DALA) 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.

#### 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

The burning of coal in the proposed power station will potentially release significant amounts of air pollutants such as Sulphur Dioxide (SO<sub>2</sub>), Nitrogen oxides (NO<sub>x</sub>) and trace emissions of various heavy metals. Ambient SO<sub>2</sub> levels are already being exceeded in the area due to other sources of air emissions. Considerable potential exists for cumulative concentrations and increases in the magnitude and frequency of SO<sub>2</sub> limit exceedences and hence spatial extent of non-compliance.

### Sensitive Receptors

Residential areas in the immediate vicinity of the proposed power station sites include Phola and Ogies, located some 10 to 18 km east of the proposed sites, with smaller areas such as inter alia Voltago, Cologne, Klippoortjie, Madressa, Witcons, Saaiwater, Tweefontein and Klipplaat also in the vicinity. The largest residential concentration within a 30 km radius of the proposed power station is Witbank to the east, while Bronkhorstspruit is located further to the west. In addition, the Kendal Poultry Farm situated on portions 30, 31, 62, 27 and 28 of the farm Klipfontein was identified as a potential sensitive receptor.

|                                     |  |
|-------------------------------------|--|
| <b>Project component/s</b>          | List of project components affecting the objective:<br>» Stack emissions<br>» Coal handling<br>» Ash handling<br>» Ash dumps<br>» Topsoil use and recovery initiatives |
| <b>Potential Impact</b>             | » Impact on air quality<br>» Impact on human health  |
| <b>Activity/risk source</b>         | » Coal combustion<br>» Coal and ash handling<br>» Wind entrainment from the ash dump<br>» Recovery and use of topsoil material   |
| <b>Mitigation: Target/Objective</b> | » To ensure compliance with ambient air quality standards<br>» To ensure compliance with the conditions and emission limits in the Atmospheric Emission Licence        |

| <b>Mitigation: Action/control</b>   | <b>Responsibility</b>  |
|---|--|
| Obtain air emissions permit/license from CAPCO and ensure compliance with the requirements of this permit/license, once issued. | Eskom Obtain permit:<br>Generation<br>Environmental Management<br>Ensure compliance:<br>Kusile Power |

| <b>Mitigation: Action/control</b>   | <b>Responsibility</b>  |
|---|--|
|   | Station  |
| Install, commission and operate any required SO <sub>2</sub> 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).  | Eskom: Kusile power station  |
| Particulate abatement measures such as bag filters or electrostatic precipitators must be implemented to reduce PM <sub>10</sub>  | Eskom  |
| Initiate a programme to support initiatives aimed at improving air quality in the Witbank residential area. In order to initiate such a programme, an assessment will be conducted to identify initiatives to improve the air quality in the Witbank area. This is expected to will take about 1 year. Completion date for study is anticipated to be April 2011. Thereafter the initiatives will be implemented. | Eskom: General Environmental Management  |
| Maintain power station equipment according to industry standard in order to achieve required emission standards.  | Eskom: Kusile Power Station  |
| Manage ash disposal areas to minimise their potential for dust pollution.   | Eskom: Kusile Power Station  |
| Maintain all vehicles in a roadworthy condition.  | Eskom: Kusile Power Station  |
| Roads will be sealed and maintained to ensure that dust emissions are minimised.  | Eskom: Kusile Power Station  |
| Burning of waste material such as vegetation and old cleaning materials resulting from maintenance activities at a site is strictly prohibited.   | Eskom: Kusile Power Station  |
| 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: Kusile Power Station  |
| Monitor on a quarterly basis the reproductive health of the poultry from the Kendal Poultry Farm (Pty) Ltd for at least a two year period. Implement corrective measures if it is conclusively established that there is a casual connection between the emissions from the power station and any deterioration in the health of the chickens.  | Eskom in consultation with Mr JH van der Merwe of the Kendal Poultry Farm (Pty) Ltd      |
| Establish an ambient air quality monitoring station to monitor the ambient air impact of the power station.   | Eskom  |
| Develop and implement an air pollution management plan for the power station.   | Development: Generation Environmental Management<br>Implementation: Kusile Power Station |

|                              |   |
|------------------------------|---|
| <b>Performance Indicator</b> | » Compliance with ambient air quality limits, to be evaluated using measurements collected at ambient air quality monitoring stations |
|------------------------------|---|

|                   |   |
|-------------------|---|
|                   | <p>located in the nearby residential areas.</p> <ul style="list-style-type: none"> <li>» Compliance with conditions and emission limits stipulated in the Atmospheric Emission Licence.</li> <li>» No complaints from affected residents or community regarding emissions once Kusile power station is fully operational.</li> </ul>  |
| <b>Monitoring</b> | <ul style="list-style-type: none"> <li>» Continuous emission monitoring systems are to be installed on all units to measure emissions of SO<sub>2</sub>, NO<sub>x</sub> and PM, in addition to O<sub>2</sub> and volumetric flow rate.</li> <li>» Ambient air quality (SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> and O<sub>3</sub>) and meteorology is to be continuously monitored at the ambient air quality monitoring station to be established.</li> <li>» Fugitive dust emissions are to be monitored from the ash dump.</li> <li>» Results of the ambient air quality monitoring are to be reported quarterly to the relevant authority.</li> <li>» Emissions are to be reported monthly to the relevant authority.</li> <li>» 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.</li> <li>» An incident reporting system will be used to record non-conformances to the EMP.</li> </ul> |

***OBJECTIVE: Minimisation of impacts on surface and groundwater resources***

Raw materials such as process chemicals and liquid fuel used at the proposed power station and liquid waste products from the operation of the power station could contaminate the groundwater resource in the area, having an affect on current and potential groundwater users.

Initial investigations indicated that groundwater was being utilised in the study area for potable consumption and irrigation purposes. The proposed power station and its associated infrastructure use materials and generate waste that could potentially contaminate groundwater in the region. Materials used include process chemicals, and waste generated include inter alia coarse and fly ash, treated waste water, and run-off from the coal stockyard. Though Eskom operates its power stations on the basis of a 'zero liquid effluent discharge' (ZLED) philosophy, there is still potential for groundwater resources to become contaminated through recharge of the groundwater system with polluted water, especially during the build-up period. Consequently, a groundwater assessment was undertaken by Groundwater Consulting Services, to determine the level of groundwater use in the area and its quality in order to determine the potential impacts on the resource from the power station, to determine how the by-products of atmospheric abatement technologies would affect the groundwater and to recommend mitigation measures to minimise or remove the potential impacts.

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

The possible sources of contamination or infrastructure that may impact on the groundwater or surface water were identified to be (Ninham Shand, 2007):

| Infrastructure   | Possible contamination source  |
|--|--|
| Coal stockyard   | Potential acidic leachate  |
| Raw water dams   | Artificial Recharge  |
| Wastewater treatment facility and its associated dams and sludge drying beds | Irrigation of effluent may impact on groundwater                         |
| Treated (de-ionized) water system  | Brine added to fly ash for deposition on ash dump                        |
| Recovery (dirty water) dams  | Overflow and irrigation may impact on groundwater                        |
| Various grades of oil  | Oil and infiltration into the groundwater system requires treatment      |
| Ash dump & ash dump toe dam  | Potential source of leachate that will artificially recharge groundwater |

|                                     |   |
|-------------------------------------|---|
| <b>Project component/s</b>          | List of project components affecting the objective:<br>» Coal stockpiles<br>» Raw water dam<br>» Sewage plant and dams<br>» Treated (de-ionized) water system<br>» Evaporation dams<br>» Recovery (dirty water) dams<br>» Various grades of oil<br>» Ash dump<br>» Ash dump toe dam<br>» Solid waste site   |
| <b>Potential Impact</b>             | » Contamination of surface and groundwater resources  |
| <b>Activity/risk source</b>         | » Poor quality water stored on site recharging the groundwater<br>» Artificial recharge impacting on groundwater<br>» Solid waste site (all waste transported to a licensed waste site until a licensed site is available)<br>» Seepage below the ash dump<br>» Poor quality surface water on site<br>» Sewage facilities<br>» Fuel oil<br>» Surface water supply<br>» Coal stockyard |
| <b>Mitigation: Target/Objective</b> | » Ensure appropriate management and use of water resources<br>» Minimise potential for impacts on surface and groundwater   |

| Mitigation: Action/control   | Responsibility       |
|--|----------------------|
| Obtain an integrated water use licence application from DWA for the water uses associated with the operation of Kusile Power Station.  | Eskom                |
| Establish the coal stockyard on top of a suitably prepared surface to prevent leaching into the groundwater.   | Eskom                |
| The area where the ash dump is to be established must be lined to prevent leaching to the groundwater.   | Eskom                |
| Dams with a higher groundwater pollution risk must be sited on appropriate underlying geological strata or these dams must be lined.   | Eskom                |
| All polluted water must be recycled until all pollutants are captured as waste for disposal with the ash deposition  | Eskom                |
| Ensure that the metering procedure of water supplied to the power station measures to a level of accuracy of 0,5%. Water and salt balances must be carried out once a month to verify performance and identify potential problems.   | Eskom                |
| Leak detections and inspections must be implemented on site and along pipelines  | Eskom                |
| Cooling water sludge from the cold lime softening process must be co-disposed with ash   | Eskom                |
| The sludge removed from ware water storage dams and reservoirs must be used in borrow pits or cover for waste sites.   | Eskom                |
| The 'dirty' water generated on site and considered for irrigation must be tested to determine its suitability in terms of salinity and Sodium Absorption Ratio (SAR)   | Eskom                |
| Groundwater quality must be continually monitored and measures must be implemented to ensure that pollution of the resource does not occur. Ground water levels are monitored every six months (once in the beginning of dry season and once in the beginning of wet season). Parameters monitored include: pH, DO, TDS, Temp, Total Suspended Solids, Total Hardness as Calcium Carbonate, EC, Nitrates, Ammonia, Phosphates, Fluoride, sulphates, chloride, aluminium, sodium, magnesium, manganese, calcium, potassium and iron. Refer to Appendix E for details of the monitoring programme. | Eskom                |
| 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                |
| All hazardous substances at the site shall be adequately stored and accurately identified, recorded, and labelled (that is, polychlorinated biphenyls – PCB/Askarel).  | Eskom/<br>contractor |
| All waste to be disposed of at an appropriate waste facility by an appropriate contractor.   | Eskom/<br>contractor |
| Spill kits will be made available on site for the immediate clean up of spills and leaks of contaminants.  | Eskom                |
| Spill response procedures to include removal/disposal of potentially contaminated materials to avoid secondary pollution of water sources.   | Eskom/<br>contractor |

| Mitigation: Action/control   | Responsibility |
|--|----------------|
| Contaminated materials to be disposed of at an appropriately licensed waste disposal site.   |                |
| In the event of a major spill or leak of contaminants, the administering authority will be contacted immediately as per incident reporting procedures. | Eskom          |

|                              |   |
|------------------------------|---|
| <b>Performance Indicator</b> | <ul style="list-style-type: none"> <li>» No contamination of surface and groundwater resources indicated by monitoring results.</li> <li>» 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.</li> <li>» No complaints from affected residents or community regarding water quality or quantity.</li> </ul>   |
| <b>Monitoring</b>            | <ul style="list-style-type: none"> <li>» Ground water levels to be monitored every six months (once in the beginning of dry season and once in the beginning of wet season).</li> <li>» Groundwater quality to be monitored quarterly. Parameters monitored include: pH, DO, TDS, Temp, Total Suspended Solids, Total Hardness as Calcium Carbonate, EC, Nitrates, Ammonia, Phosphates, Fluoride, sulphates, chloride, aluminium, sodium, magnesium, manganese, calcium, potassium and iron.</li> </ul> |

**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 dimensions include: six cooling towers with a height of some 180 m each, unclad boilers will further reduce the visual quality of the region, exacerbating the industrial character of the region. A coal conveyor on the landscape is likely to create a prominent line in the landscape, in contrast to the natural landscape.

|                             |   |
|-----------------------------|---|
| <b>Project component/s</b>  | List of project components affecting the objective: <ul style="list-style-type: none"> <li>» Smoke stacks</li> <li>» Power station building</li> <li>» Ash dams</li> <li>» Coal stockpiles</li> <li>» Conveyor Belts</li> </ul> |
| <b>Potential Impact</b>     | <ul style="list-style-type: none"> <li>» Visual intrusion on surrounding areas</li> </ul>   |
| <b>Activity/risk source</b> | <ul style="list-style-type: none"> <li>» Size/scale of power station cooling towers (~180 m in height)</li> <li>» Size/scale of ash dams</li> <li>» Associated lighting</li> <li>» Conveyor systems</li> </ul>                  |

|                         |  |
|-------------------------|--|
| <b>Mitigation:</b>      | » To minimise potential for visual impact  |
| <b>Target/Objective</b> | » Minimise contrast with surrounding environment and visibility of the power station |

| <b>Mitigation: Action/control</b>  | <b>Responsibility</b>    |
|--|--------------------------|
| 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/ lighting engineer |
| Low pressure sodium lights are regarded as highly energy efficient and should be considered for security lighting.   | Eskom/ lighting engineer |
| Periodic adjustment of lighting shields or covers to compensate for the movement of the ash depositing device.   | Eskom                    |
| Ensure timely maintenance of the power station, ancillary infrastructure and the general surrounds of the property (gardens, access roads, etc.) in order to prevent the visual impact of degradation and perceived poor management.   | Eskom                    |
| Maintain screening vegetation along the perimeter roads passing the site, around the coal stockyard and the ash dump to screen views of the project components from the surrounding areas.   | Eskom                    |
| Use of overtly contrasting and bright colours will be avoided when painting the cladding of the power station. Natural hues that compliment 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                    |
| 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.   | Eskom                    |
| The final slope configuration of the ash dump should avoid sharp angles and straight lines. The slope typically consists of benches and rises. The edges that will be formed should be rounded to create an even light distribution over the edge and avoid distinct, straight shadow lines.                   | Eskom/design engineer    |

|                              |  |
|------------------------------|--|
| <b>Performance Indicator</b> | » Minimised visual intrusion on surrounding areas.<br>» Minimised visual impact associated with lighting of the power station. |
| <b>Monitoring</b>            | » Ensure that adequate safety lighting is installed and is functional at all times.  |

***OBJECTIVE: Maintain the noise levels around the power station site within acceptable levels and minimise the impact on residential areas and communities***

The establishment of a coal-fired power station and its associated infrastructure may elevate the ambient noise levels in the vicinity of the power station site and the surrounding areas to unacceptable levels, as defined in the SANS 10103 standards.

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, the sewage works and traffic associated with the operation of the power station.

Approximately 72 cooling fans would be required per generating unit, totalling 432 fans. The fans would be located approximately 50 m above ground level, on the north-western side of the power station precinct. Other infrastructure that would generate noise includes the conveyor belt system for the coal supply and ash removal (specifically the conveyor belt drive houses), the ash dump spreading operations, the sewage treatment works, and the additional vehicle traffic and rail traffic generated as a result of the station.

The study area is fairly flat, with no natural features to assist in the attenuation of noise. The wind can result in enhancement (downwind) or reduction (upwind) of noise levels.

### ***Sensitive receptors***

Built-up areas such as Bronkhorstspuit, Witbank, Voltago, and Phola are located 20 km, 30 km, 8.5 km and 18 km respectively from the Kusile Power Station. Various sensitive receptors were identified in the vicinity of the power station (refer to Figure 5.3 and Table 5.11 of the final EIA Report).

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

| <b>Mitigation: Action/control</b>   | <b>Responsibility</b> |
|---|-----------------------|
| 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                 |
| The latest technology incorporating maximum noise mitigating measures for the power station components should be implemented into the system.   | Eskom                 |
| The design process is to consider, inter alia, the following aspects:   | Eskom                 |



| Mitigation: Action/control  | Responsibility                   |
|---|----------------------------------|
| <ul style="list-style-type: none"> <li>* The position and orientation of buildings on the site.</li> <li>* The design of the buildings to minimise the transmission of noise from the inside to the outdoors.</li> <li>* The insulation of particularly noisy new plant and equipment.</li> </ul> |                                  |
| Buildings housing noisy machinery must be insulated in order to minimise the transmission of noise through the walls and roof.  | Eskom                            |
| Maintain power station equipment according to industry standard.  | Eskom                            |
| Noise mitigation measures must be investigated by an acoustical engineer and more information with regards to the cooling fans shields must be provided. This information must be provided to DEA as soon as possible, but within 6 months of the commencement of operation of the power station. | Eskom/<br>acoustical<br>engineer |
| Use the National Noise Control Regulations, Gauteng 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                            |

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

***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.

Surplus land associated with the power station has been allocated previous landowners who were willing to continue with their farming activities (refer to Appendix F for details of properties and lessees). All the previous landowners were requested to put their request in writing on condition that should the need arise that Eskom need to utilise the land they are leasing, Eskom would take it back by giving a month's notice to the farmer.

|                            |  |
|----------------------------|--|
| <b>Project component/s</b> | List of project components affecting the objective: <ul style="list-style-type: none"> <li>» Power station property (including access roads, fences and access control points)</li> <li>» Areas rehabilitated post-construction</li> </ul> |
| <b>Potential Impact</b>    | <ul style="list-style-type: none"> <li>» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention</li> </ul>       |

|                                     |  |
|-------------------------------------|--|
| <b>Activity/risk source</b>         | <ul style="list-style-type: none"> <li>» Power station property</li> <li>» Areas disturbed during construction</li> </ul>  |
| <b>Mitigation: Target/Objective</b> | <ul style="list-style-type: none"> <li>» To undertake power station property is maintained such that environmental integrity is ensured</li> <li>» To ensure and encourage site rehabilitation of disturbed areas</li> </ul> |

| <b>Mitigation: Action/control</b>  | <b>Responsibility</b> |
|--|-----------------------|
| Clearly demarcate the boundaries of the Eskom site to ensure that the whole site is maintained throughout the operational phase (the site usually extends far beyond the security fence).  | Eskom                 |
| Protected or endangered plant and animal species 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                 |
| A site rehabilitation and landscaping program will be implemented. Indigenous plants will be used in landscaping and rehabilitation activities.  | Eskom                 |
| Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works will be addressed on a continual basis, through an alien vegetation control and monitoring programme.   | Eskom                 |
| An alien control and monitoring programme will be developed and implemented. The following elements will be included in such a programme: <ul style="list-style-type: none"> <li>» The active control of all alien invasive species by means of manual removal, ring-barking, chemical control or a combination of these methods.</li> <li>» 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.</li> <li>» 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.</li> <li>» All emergent seedlings will be removed by hand and re-sprouting from existing rootstock will be chemically treated in a continual monitoring and follow-up programme.</li> </ul> | Eskom/ specialist     |
| 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                 |
| A botanist familiar with the vegetation 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     |
| Access roads 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                 |

| Mitigation: Action/control   | Responsibility |
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| 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          |

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| <b>Performance Indicator</b> | <ul style="list-style-type: none"> <li>» Power station property maintained in a good condition.</li> <li>» No soil erosion.</li> <li>» Successful rehabilitation of disturbed areas.</li> <li>» No alien or invader plant species located on the power station property.</li> </ul>  |
| <b>Monitoring</b>            | <ul style="list-style-type: none"> <li>» Monitoring of alien and invasive species on the property.</li> <li>» 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.</li> <li>» On-going alien plant and weed monitoring and eradication should be undertaken on an annual basis.</li> </ul> |

**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
- » sewage

|                             |   |
|-----------------------------|---|
| <b>Project component/s</b>  | List of project components affecting the objective: <ul style="list-style-type: none"> <li>» Power station and associated infrastructure</li> </ul>   |
| <b>Potential Impact</b>     | <ul style="list-style-type: none"> <li>» Inefficient use of resources resulting in excessive waste generation</li> <li>» Litter or contamination of the site or water through poor waste management and hazardous substance handling practices</li> </ul> |
| <b>Activity/risk source</b> | <ul style="list-style-type: none"> <li>» Office and workshop facilities at the power station</li> <li>» Fuel and oil storage</li> <li>» Ash dump</li> <li>» Pollution control dams</li> </ul>   |
| <b>Mitigation:</b>          | <ul style="list-style-type: none"> <li>» To comply with waste management guidelines</li> </ul>  |

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| <b>Target/Objective</b> | <ul style="list-style-type: none"> <li>» To minimise production of waste</li> <li>» To ensure appropriate waste disposal</li> <li>» To avoid environmental harm from waste disposal</li> </ul> |
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| <b>Mitigation: Action/control</b>   | <b>Responsibility</b>             |
|---|-----------------------------------|
| Waste streams will be separated at source (i.e. general from hazardous waste) and stored in appropriate waste disposal containers.  | Eskom                             |
| 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 and disposed of separately.   | Eskom/waste management contractor |
| Hazardous substances will be temporarily stored in sealed containers within a clearly demarcated designated area.   | Eskom                             |
| Storage areas for hazardous substances will be appropriately sealed and bunded.   | Eskom                             |
| All structures and/or components replaced during maintenance activities will be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.   | Eskom                             |
| Care will be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials will take within an appropriately sealed and bunded area. Should any accidental spillage take place, it will be cleaned up according to specified standards regarding bioremediation. | Eskom                             |
| Waste handling, collection and disposal operations will be managed and controlled by a waste management contractor.   | Eskom/waste management contractor |
| Wastewater: Water from bunds and oily water from oil/water separator will be removed by a licensed contractor.  | Eskom/waste contractor            |
| Oil and water separator must effectively remove oil from water so that only contaminated oil is removed from site by contractor.  | Eskom                             |
| Used oils and chemicals: <ul style="list-style-type: none"> <li>» Appropriate disposal shall be arranged with a licensed facility in consultation with the administering authority.</li> <li>» Waste will be stored and handled according to the relevant legislation and regulations.</li> </ul>                                   | Eskom/waste management contractor |
| Disposal of waste will be in accordance with relevant legislative requirements, including the use of licensed contractors.  | Eskom                             |

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| <b>Performance Indicator</b> | <ul style="list-style-type: none"> <li>» No complaints received regarding waste on site or indiscriminate dumping.</li> <li>» Internal site audits identifying that waste segregation recycling and reuse is occurring appropriately.</li> <li>» Provision of all appropriate waste manifests.</li> <li>» No contamination of soil, water or air.</li> </ul> |
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| <b>Monitoring</b> | <ul style="list-style-type: none"> <li>» Waste collection will be monitored on a regular basis.</li> <li>» Waste documentation will be completed and available for inspection on request.</li> <li>» 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.</li> <li>» Regular reports on exact quantities of all waste streams exiting the site will be compiled by the waste management contractor and monitored by the SHE Representative. All appropriate waste disposal certificates accompany the monthly reports.</li> </ul> |
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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.

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| <b>Project component/s</b>          | List of project components affecting the objective:<br><ul style="list-style-type: none"> <li>» Power station and associated infrastructure</li> </ul> |
| <b>Potential Impact</b>             | <ul style="list-style-type: none"> <li>» Community opposition and/or attitude formation towards the operation of the power station</li> </ul>          |
| <b>Activity/risk source</b>         | <ul style="list-style-type: none"> <li>» Power station operation</li> </ul>  |
| <b>Mitigation: Target/Objective</b> | <ul style="list-style-type: none"> <li>» To ensure the on-going effective management and communication with affected communities</li> </ul>            |

| Mitigation: Action/control  | Responsibility            |
|---|---------------------------|
| Community forums and communication channels between the local communities, contractors and Eskom must be established and maintained.  | Eskom<br>Community forums |
| 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.   | Eskom                     |
| An emergency plan of action will be concluded with the neighbouring property owners and the relevant authorities in the case of an emergency (veld fire, oil spillage, water contamination, etc.). Eskom contact names and telephone numbers will be given to all neighbours, and vice versa. | Eskom                     |
| Removal (pilfering) of agricultural products (sugar cane, fruit, vegetables, stock, fire wood, etc.) and poaching on surrounding properties are prohibited.   | Eskom                     |
| Environmental clauses will be included in contract documents for all contractors (the services of contractors with proven track records of sound environmental  | Eskom                     |

| Mitigation: Action/control  | Responsibility |
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| performance shall be used). |                |

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| <b>Performance Indicator</b> | » Appropriate communication channels established between Eskom and affected communities.   |
| <b>Monitoring</b>            | » 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)**

**APPENDIX E:  
GROUNDWATER MONITORING PROGRAMME**

**APPENDIX F:  
DETAILS OF PROPERTIES AND LESSEES ASSOCIATED WITH THE  
ACTION PLAN TO MANAGE SURPLUS LAND**