ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Compiled by:

MG Dlamini

(PGD in Water Resources Management)

1. INTRODUCTION

Eskom Holdings SOC (Ltd), is a South African utility that generates, transmits and distributes electricity. Eskom supplies about 95% of the country's electricity. Kriel Power Station is a 3000MW installed capacity base load coal fired power station, consisting of 6x500MW units. The planning and design of Kriel Power Station began in the early seventies. Construction also started in the early seventies and the station began operating at full capacity in late 1979.

The station's Atmospheric Emission Licence (AEL), (Atmospheric Emission Licence No: 17/4/AEL/MP312/11/09), issued after consideration of the February 2015 Department of Environmental Affairs' decision on Eskom's application for postponement of compliance to the April 2015 and April 2020 particulate emissions limits, as contemplated in Section 43 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), requires Kriel Power Station to conform to a maximum release rate of a monthly average of 125mg/Nm3 from the 1st of April 2015 to the 31st of March 2020, and further to 50mg/Nm3 daily by the 1st of April 2020, for particulate emissions. All six units are currently operating with Electrostatic Precipitator (ESP) technology for particulate abatement. The current design of the existing Electrostatic Precipitators (ESP's) at Kriel Power Station will not be able to consistently meet the more stringent particulate emission limits, and the need exists to replace the installed particulate capturing systems with more efficient and effective particulate control systems. The replacement systems selected by Eskom is Fabric Filter Plants (FFP's).The purpose is to consistently meet the particulate emission licence limit as set out in the said station's Atmospheric Emission Licence.

2. IDENTIFICATION OF IMPACTS

The procedures to identify possible impacts are as follows:

- Identify the current environmental conditions (i.e. baseline) against which to assess impacts;
- Identify the future changes in the receiving environment baseline if the project does not proceed;
- An understanding of the proposed activity in sufficient detail; and
- Assessed documents, previous and adjusted layout plan was taken into account to predict possible impacts and mitigation measures.

The classification of an issue as a **'key issue'** was done after the assessment of the specialist reports and does not necessarily imply that an impact of high significance will result. After mitigation measures, it is possible that a **key issue** may turn out to have an impact of **low** or **no** significance.

3. ASSESSMENT OF IMPACTS

The methodology for assessing impacts and assigning significance to the key issues is according to "Guideline 5: Assessment of alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006" published by DEAT in June 2006.

The description and prediction of the impacts are summarized in the Tables below.

CONSTRUCTION IMPACTS – PREFFERED SITE

Table 1.

Potential impact on Physical Aspects	
Nature of the impact: Soil erosion	The proposed project will have a potential to encourage avenues for degrading of soil structure in the footprint during the construction and post construction phases.
Extent	Site (limited to the site boundaries)
Duration	Medium term (limited to the lifespan of the project and reversible over time if mitigated)
Intensity / Severity	Low (will have small negative impacts)
Probability / Certainty	Probable
Significance	Medium
Proposed mitigation: It is imperative that movement of equipment and machinery be restricted to designated roads to access the site. Stipulations of the Environmental Management Programme (EMPr) should be adhered to during the construction phase of the project until decommissioning. Where backfill material is deficient, it must be made up by importation from an approved borrow pit.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 2

Potential impacts on the Atmosphere	
Nature of impact Generation of dust and noise	Dust emissions will be experienced during the movement of construction material and machinery onto site. Dust can also be generated during excavation. With the movement of these equipment, there will be noise stemming from the roar of engines and loose items on the trucks. Noise from the workers can also be experienced by locals as they travel to and from site.
Extent	Site
Duration	Short term/ once off
Intensity / Severity	Low
Probability / Certainty	Probable
Significance	Low
Proposed mitigation: Loading of equipment should be done in such a manner that items are placed tightly against each other so that they do not collide against each other as the truck rocks through unstable surfaces of the access	

roads. High speeding should be discouraged at all times. Construction vehicles should be kept in good condition at all times. Vehicles in good condition are not likely to generate high pitched roars especially if operated properly. Loading bins of vehicles should be rubberised as that reduces rattling sounds. Construction workers should be alerted not to scream at the public especially as they pass by residential areas. The same applies to unnecessary hooting of construction vehicles.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 3

Potential impact on Skyline and Immediate Environment	
Nature of impact Visual impacts	A construction team will be present on site for the duration of the construction phase. The construction camp will be located in the dedicated area between boiler 6 and cooling tower 3. Possible additional dust clouds may occur during the construction process. No major visual changes are expected and at most, the work on the silo and FFP will be visible from the immediate surroundings. Construction equipment such as a mobile crane may be the only real sign that there is construction activity at the power station.
Extent	Site
Duration	Permanent
Intensity / Severity	Low
Probability / Certainty	Definite
Significance	Low
Proposed mitigation: Alignment of structures should be compatible with the existing structures. Built structures should, as far as is practicable, not break the horizon. Make use of existing access roads where possible.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 4

Potential impacts on Soil Pollution	
Nature of impact Pollution and spillages of hazardous waste	The use of heavy construction machinery is associated with possible leaks, spillages of hydraulic oils, diesel fuels and grease. Such spillages can contaminate the soil, surface and underground water if in larger quantities. Such spillages are detrimental to biodiversity as they strange elements with the ecosystem and obviously poisonous. In this case, the soil is regarded as dead. Smaller insects that survive on the water surface will be affected as diesel and oil create a layer on the water surface thereby disturbing them as they swim and suffocating as they get covered with in a layer of oil.
Extent	Site
Duration	Medium term
Intensity / Severity	Low
Probability / Certainty	Unsure
Significance	Low
Proposed mitigation: Machinery with hydraulic equipments like hydraulic jacks and lifts should be inspected and maintained on a daily basis to guard against possible leakages and malfunctioning of such equipments. Refuelling of machinery and trucks should be done at a designated site and such site should be paved with a concrete slab to avoid soaking of oils into the ground in the event of accidental spillages. Storage facilities fuels and related liquids should be located away from the vicinity of surface water. A concrete slab will be easy to clean prior to overflow further contamination. Fuel container should be inspected for possible leaks at all times. Used and empty drums that contained grease, diesel, hydraulic oil and petrol should be disposed of at a registered and licensed facility to avoid pollution and contamination of soil and water.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 5

Potential Impact on Neighbourhood (Social) and Site	
Nature of impact Undisciplined contract workers	Experience has proven that undisciplined contract workers pose a serious problem with the surroundings where they travel, work and live. Littering is one of the major challenges experienced in and around construction sites. Food packaging material is normally discarded wherever construction workers might be having their lunch and left lying all over. As they travel along access roads, smokers will discard cigarette buds which would still be on fire which normally ignites veld fires. Screaming and insulting of community members by undisciplined contract workers is very common as they pass by residential areas to and from site. Interference with families located along construction sites where construction workers start relationships with married women is very common. Disputes between construction workers and families erupt in this instances resulting in social instability in individual families. Prostitution comes along with such relationships where construction workers spend their monies for such services and deprive their own families of the benefits from their work which impacts on families at remote distances. The result of this state of affairs has serious impacts on work performance on the part of the workers themselves.
Extent	Local
Duration	Short term
Intensity / Severity	Low
Probability / Certainty	Unsure
Significance	Low
Proposed mitigation: The contractor should have a code of conduct documented to address the required standards in terms of team member's behaviour. Workers should be allocated a site where they can have their lunch. It should be strictly noted that smokers should not discard life cigarette buds anywhere else other than a designated smoking area where the risk of veld fire is not eminent or such be placed in ashtrays. Workers should be warned not to insult the public and respect whoever they come across. Befriending locals especially women should be prohibited at all costs. In the event where a camp site is allocated, resident security guard should be deployed for the purpose of access control and monitoring. This will help in protecting property and equipment from theft and possible damage. Through the employee wellness programme, workers should be advised to take care of their benefits in order to see growth in their socio-economic conditions of their respective families. This will encourage them to perform better in their workplace.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 6

Potential Impacts on Regional Environment and Downstream	
Nature of impact	Spillages of diesel, hydraulic oil, grease and other volatile fuels can be carried away with surface water run-off into rivers and neighbouring properties. This can result in water bodies being contaminated and aquatic life threatened downstream. Spillages can soak into ground water and into wetlands thereby impacting on the wetland ecosystem which might be eminent over time especially downstream. If in excess, this can pollute underground water and render it unusable for boreholes therefore not suitable for consumption. Litter can be carried away through wind and surface run-off to neighbouring properties away from the site. This might end up in storm water drainage lines and causing blockages. Some litter might be deposited along the banks of water courses due to overflow and reduction in velocity of the flow. Litter deposited on drainage sites and scattered all over is unsightly and have a serious visual impact. Livestock the likes of cattle has a tendency of swallowing plastic bags and related material which normally result into digestion complications and sudden loss of weight and sudden death.
Pollution and littering	
Extent	Local
Duration	Medium term
Intensity / Severity	Medium
Probability / Certainty	Unsure
Significance	Low
Proposed mitigation: Storage facilities of fuels and related liquids should be locked and containers tightly closed to avoid accidental spillages in the event the container falls over. All surfaces where these liquids are stored should be paved with reinforced concrete slab to avoid cracks through which spillages can leak into the ground. Inspections should be conducted at all times to guard against hidden impacts occurring due to leaks. Routine litter picking should be conducted and litter bins supplied to specific sites.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

1. POTENTIAL IMPACTS DURING CONSTRUCTION.

Table 1: Assessment of predicted impacts before mitigation measurements are applied in the construction phase.

ISSUE	NATURE OF IMPACT	EXTENT / LOCATION	DURATION	MAGNITUDE / INTENSITY	PROBABILITY	SIGNIFICANCE	DIRECT / INDIRECT / CUMULATIVE	STATUS
Topography & Geology	Flat – Moderate. Erosion.	Local	Short term	Low	Probable	Low	Direct	Negative
Surface & Ground water quality	Possible leaks, spillage of hydraulic oils, diesel and grease.	Site	Short term	Medium	Definite	Medium	Direct	Negative
Waste Management	Construction material created with retrofitting of ESPs to FFPS.	Site	Short term	Low	Definite	Medium	Direct	Negative
Air Quality	Dust during construction by construction vehicles.	Site	Short term	Low	Probable	Low	Direct	Negative
Noise Pollution	Malfunction of vehicles. Noisy workforce.	Site	Short term	Low	Unsure	Low	Indirect	Negative
Visual	Retrofitting of ESPs to FFPs	Local	Short term	Medium	Definite	Low	Indirect	Negative
Socio-Economic	Job creation and local economic impact.	Local	Long term	High	Definite	High	Direct	Positive
	Undisciplined workers.	Local	Short term	Low	Definite	Medium	Indirect	Negative
	Traffic and neighbourhood disruptions.	Site	Short term	Medium	Probable	Medium	Direct	Negative

Table 2: Suggested management actions to mitigate possible negative impacts during construction phase.

ISSUE	POTENTIAL IMPACT	MANAGEMENT ACTIONS	MONITORING OF IMPACTS
Surface & Ground Water Quality	• Possible leaks, spillage of hydraulic oils, diesel and grease from heavy machinery.	• Inspect machinery and equipment for possible leaks and malfunction. • Refuelling should be designated to a specific concrete site. • Refuelling site has to be more than 200m from a stream, drainage line or wetland. • Empty grease, diesel, hydraulic oil and petrol should be disposed of at a licensed hazardous facility.	• Inspect and maintain equipment on a daily basis. • Regular checking of diesel tanks. • Regular removal of empty drums.
Waste Management	• Waste can be created during the construction phase in the form of excess concrete, cement bags. • Workers can litter during lunch times.	• After the construction of poles, all waste has to be removed to a registered landfill site. • Workers have to take all their waste with them after lunch. • All waste to be removed on a daily basis.	Inspection by ESKOM personnel and the ECO.
Air Quality	• Dust can be generated during excavation due to hard rock.	• Workers should wear designated Personal Protective Equipment (PPE).	Daily monitoring of covered areas. Adherence to PPE by the workforce.
Noise Pollution	• Movement of equipment and inspection by management.	• Regular servicing of vehicles to prevent high pitched roars	Daily monitoring of vehicles.
	• Noise created by workers when travelling to and from sites.	• Construction workers should be alerted not to scream or hoot at the public or near residential areas.	No monitoring needed
Visual	• The establishment of the site office and FFPs will be visually exposed and can have a possible negative impact on the environment.	• Restrict to already existing infrastructure.	No monitoring needed
Socio-Economic	• Job creation and local economic impact.	• First preference to be given to locals where possible.	No monitoring needed.
	• Undisciplined Workers	• Workers have to be provided with a code of conduct to address the required standards in terms of team member's behaviour and not to insult the public. • Workers should have an allocated site for lunch. • Smokers should not discard life cigarette buds to prevent fire risk. • Access control at camp site to protect equipment and property.	No monitoring needed.

POTENTIAL IMPACTS DURING THE OPERATIONAL PHASE.

Table 3: Assessment of predicted impacts before mitigation measurements are applied in the operational phase.

ISSUE	NATURE OF IMPACT	EXTENT / LOCATION	DURATION	MAGNITUDE / INTENSITY	PROBABILITY	SIGNIFICANCE	DIRECT / INDIRECT / CUMULATIVE	STATUS
Surface or Ground water quality	Possible leakage of oil, grease on site leading to surface and groundwater pollution.	downstream	Long term	Low	Unsure	Low	Indirect	Negative
Waste management	Minimum waste will be created during inspections/surveys.	Local	Long term	Low	Unsure	Low	Direct	Negative
Visual	Establishment of a site office and retrofitting of ESPs to FFPs	Local	Long term	High	Definite	Medium	Direct	Negative
Social Impacts	Undisciplined workers	Site	Long term	Medium	Definite	Medium	Direct	Negative
	The quality of life of the residents that will receive electricity will improve dramatically.	Local	Long term	High	Definite	High	Direct	Positive
Air Quality	Dust generated during excavation.	Local	Long term	Low	Definite	High	Direct	Negative
Noise Pollution	Movement of equipment and inspection by management.	Local	Short term	Medium	Definite	High	Direct	Negative

Table 4: Suggested management actions to mitigate possible negative impacts during operational phase.

ISSUE	POTENTIAL IMPACT	MANAGEMENT ACTIONS	MONITORING OF IMPACTS
Surface & Ground Water quality	• Possible leaks, spillage of hydraulic oils, diesel and grease from heavy machinery during maintenance.	• Inspect machinery and equipment for possible leaks and malfunction.	Inspect and maintain equipment before a maintenance trip.
Waste management	• Waste can be created during the maintenance.	• All possible waste has to be removed from the site after a maintenance survey. • Workers have to take all their waste with them after lunch.	Inspection of ESKOM personnel after maintenance team was on site.
Air Quality	Dust can be generated during excavation.	• Vehicles have to drive slowly to create less dust. • Workers should wear designated Personal Protective Equipment (PPE). • Record Keeping, Environmental Reporting and community Liaison.	Daily Monitoring.
Noise pollution	• Movement of equipment and inspection by management.	• Regular services of vehicles to prevent high pitched roars • Employers must do a risk assessment if employees could be exposed to loud noise.	Daily monitoring of vehicles.
	• Noise created by workers when travel to and from sites.	• Construction workers should be alerted not to scream or hoot at the public or near residential areas.	No monitoring needed
Visual	Visibility of established site office and retrofitting of ESPs to FFPs	• Restrict retrofitting to already existing infrastructure.	No monitoring needed
Socio-economic	Undisciplined staff/workers	• Workers have to be provided with a code of conduct to address the required standards in terms of team member's behaviour and not to insult the public. • Workers should have an allocated site for lunch. • Smokers should not discard life cigarette buds to prevent fire risk.	Regular training of workers.

3. ENVIRONMENTAL IMPACT STATEMENT

Environmental Impact Statement

ALTERNATIVE 1 (PREFERRED ALTERNATIVE)							
Phase	Nature of Impact	Extent	Duration	Intensity/ Severity	Probability/ Certainty	Significance	
						Before	After mitigation
Planning							
	Land use	Site	Long term	Low	Definite	Low	Low
	Locality	Site	Long term	Low	Definite	Low	Low
Construction							
	Surface & groundwater quality	Site	Short term	Medium	Definite	Medium	Low
	Waste management	Site	Short term	Low	Definite	Medium	Low
	Loss of Fauna & Flora	Site	Long term	Medium	Unsure	Low	Low
	Air quality	Site	Short term	Low	Probable	Low	Low
	Noise	Site	Short term	Low	Unsure	Low	Low
	Visual impacts	Local	Short term	Medium	Unsure	Low	Low
	Social Impact	Local	Short term	Medium	Definite	High-Medium	Low
Operational							
	Surface & groundwater quality	downstream	Long term	Low	Unsure	Low	Low
	Waste management	Local	Long term	Low	Unsure	Low	Low
	Visual impacts	Local	Long term	High	Definite	Medium	Low
	Social impact: Work force	Site	Short term	Medium	Definite	Medium	Low
	Social Impacts: available electricity	Local	Long term	High	Definite	High	No mitigations