APPLICATION FOR ALTERNATIVE LIMITS AND POSTPONEMENT OR EXEMPTION OF THE MINIMUM EMISSIONS STANDARDS COMPLIANCE TIMEFRAMES FOR THE MEDUPI POWER STATION

DATE: August 2020

Report reference
ESKOM ENV20- R125 rev 2 Medupi

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

AIR	Atmospheric Impact Report
AEL	Atmospheric Emission License
AQMP	Air Quality Management Plan
DEA	Department of Environmental Affairs
DOE	Department of Energy
DSI	Direct Sorbent Injection
EIA	Environmental Impact Assessment
ESP	Electrostatic Precipitator
FGC	Flue gas conditioning
FGD	Flue gas desulphurisation
GNR	Government Notice No.
HFPS	High Frequency Power Supply
IRP	Integrated Resource Plan
IRR	Issues and Response Report
LNB	Low NO_x Burner
LPG	Liquid Petroleum Gas
NAAQS	National Ambient Air Quality Standards
NAQO	National Air Quality Officer
NEMAQA	National Environment Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NERSA	National Electricity Regulator of South Africa
NO	Nitrogen oxide
NO_2	Nitrogen dioxide
NO_X	Oxides of nitrogen ($NO_X = NO + NO_2$)
OCGT	Open Cycle Gas Turbuine
PM	Particulate Matter
PM_{10}	Particulate Matter with a diameter of less than 10 µm
$PM_{2.5}$	Particulate Matter with a diameter of less than 2.5 µm
PP	Public Participation
RTS	Return to Service
SO_2	Sulphur dioxide
TSP	Total Suspended Particulates
µm	1 µm = 10^{-6} m
WHO	World Health Organisation

LIST OF ANNEXURES

Annexure 1 Atmospheric Impact Report – Medupi (August 2020)
Annexure 2 Public Participation Report (August 2020)
Annexure 3 AEL variation request – Medupi (August 2020)

1 INTRODUCTION

Eskom, as South Africa's public electricity utility, generates, transmits and distributes electricity throughout South Africa. The utility also supplies electricity to neighbouring countries including Namibia, Botswana, Zambia, Zimbabwe and Mozambique. Eskom's principal generation technology is pulverised coal, with approximately 90% of its current generating capacity lying in coal-fired power stations. One such power station is the Medupi Power Station (hereafter referred to as "Medupi"), which is situated in Lephalale Limpopo Province. Medupi is the joint largest of Eskom's existing fleet (Kusile is a similar size) with an anticipated capacity of 4800 MW. Medupi sources its coal from the nearby Grootegeluk Coal Mine (Exxaro).

In terms of Eskom's planning, power stations will generally be shut-down (meaning that it no longer produces power) at 50 years. The specific shut-down date depends on circumstances and considerations at that time such as security of supply, social, economic and environmental impacts. Once all the units at a power station are shut down, the required process for the decommissioning of the power station begins. This usually involves dismantling the power station and rehabilitating the site. The timing of the final decommissioning depends on factors such as legislative approval, Eskom's financial position and possible repowering of the power station with 'clean'-energy technology. Medupi is a new station with construction activities having commenced in May 2007, and with the power station being at full installed capacity by 2020. It is intended to decommission the station by approximately 2070.

The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA), requires all of Eskom's coal and liquid fuel-fired power stations to meet the Minimum Emission Standards (MES) for existing and new plants as contained in GNR 893 22 November 2013 as amended in GNR 1207 on 31 October 2018 ("GNR 1207") which was promulgated in terms of Section 21 of the NEMAQA. GNR 1207 provides for transitional arrangements in respect of; a once-off postponement to compliance of minimum emissions for new plant for five years, but not beyond 31 March 2025 and, a once-off suspension for plants being decommissioned by 31 March 2030; the National Air Quality Officer may grant an alternate emission limit or emission load if certain conditions are met.

The application for any of these requests stipulated submission by 31 March 2019. A MES postponement decision was issued to Medupi in 2015 and again in 2018 in respect of compliance to the MES SO_2 limit. With the amendment of the MES regulations in October 2018 it is necessary to submit this application for alternative limits and the postponement for SO_2. Eskom has applied and received a condonation for the late submission of an application for Medupi until November 2019, and an initial application was made by that date. This document is an update of the November 2019 application with some revised information (in particular an updated Atmospheric Impact Report) as Eskom committed to in the November 2019 application and with edits after the Public Participation Process completed in August 2020.

Medupi already achieves the 50 mg/Nm^3 Particulate Matter (PM) for 'new' MES limits and meets the "new" plant standards for nitrogen oxide (NO_X - 750 mg/Nm^3), as such no changes in terms of either of these pollutants is requested.

Eskom has an existing postponement decision granting a monthly limit of 3500 mg/Nm^3 for SO_2 until 31 May 2025. From 1 April 2025 Eskom is required to comply with a SO_2 limit of 1000 mg/Nm^3. Previous planning indicated that FGD would be installed at Medupi 6 years after completion of each unit thus between 2021 and 2026. Unfortunately, there have been significant delays in the implementation of the project and in confirming funding. This in combination with the deterioration in Eskom's financial position, the negative environmental impacts and the limited health benefits associated with FGD implementation has led to a re-evaluation and consideration of an alternative approach in respect of SO_2 reduction. The alternative approach considers the enablement of a Just Energy Transition Strategy for Eskom and further investigation into less costly SO_2 reduction technologies. Eskom is thus requesting a postponement from compliance to the new plant MES until 31 March 2025 with an alternate limit of 4000 mg/Nm^3 monthly from 2020 until 2030. Achieving the new plant limit of 1000 mg/Nm^3 post-2030 would be subject to a review of alternative less costly SO_2 reduction technology and the level of compliance with ambient air standards.

A strict interpretation of the amendment of the MES regulations in 2018 has potentially restricted the legal mechanisms which would provide the authorities with the ability to grant the required time for the investigation of less costly SO_2 reduction technologies and Eskom's financial recovery. This application should thus also be considered as a request for exemption from compliance to the present MES timeframes to the Minister of DEFF, as allowed for in terms of section 59 of NEMAQA, if so required.

The purpose of this document is to present the application for the postponement and, if necessary exemption, of the requirement to meet the new plant compliance date and propose an alternative limit for Medupi as required in terms of NEMAQA. The document has been structured to present Eskom's overall atmospheric Emissions Reduction Plan including the current shut-down of units, the fleet shut-down plan and its influence on Eskom's emissions and Eskom's approach to supporting a Just Energy Transition for South Africa. The emission limits which Eskom is applying for inclusion in the station Atmospheric Emission Licence (AEL) are then proposed. Thereafter the legal basis for the application is presented, including the requirements that must be met in making such an application. Finally, the detailed reasons for the application are given.

2 ESKOM'S EMISSION REDUCTION PLAN

Eskom considers that it is not practically feasible or beneficial for South Africa (when considering the full implications of compliance and planned decommissioning) to comply fully with the 'new plant' MES by the stipulated timeframes. This is elaborated on in the sections below. Eskom is proposing a phased and prioritised approach to compliance with the 'new plant' MES across its fleet. Highest emitting stations will be retrofitted

first. Reduction of Particulate Matter (PM) emissions has been prioritised, as PM is considered to be the ambient pollutant of greatest concern in South Africa. Kusile Power Station is commissioned with Flue Gas Desulphurisation and will continue to achieve the SO_2 new plant limit. Kusile and Medupi are commissioned with abatement technology which can meet PM and NOx new plant standards. There are several power stations which comply with new plant standards for PM. There are six power stations which will be shut down before 2030, an additional two by 2035 and the remaining existing plants (excluding Majuba, Medupi and Kusile) by 2044.

Emission reduction interventions to achieve compliance with the new plant emission limit are planned for the following stations:

- Particulate Matter emission reduction: Tutuka, Kriel, Matla and Duvha Units 4-6, Kendal and Lethabo;
- NO_x emission reduction: Camden (last unit); and
- SO_2 emission reduction: at Kusile and the evaluation of alternative lower-cost technologies for Medupi.

In terms of Eskom's planning power stations will generally be shut-down (meaning that it no longer produces power) at 50 years. The specific shut-down date depends on circumstances and considerations at that time, such as security of supply, social, economic and environmental impacts. Once all the units at a power station are shut down, the required process for the decommissioning of the power station begins. This usually involves dismantling the power station and rehabilitating the site. The timing of the decommissioning depends on factors such as legislative approval, Eskom's financial position and possible repowering of the power station with 'clean'-energy technology. To date 15 units between Grootvlei, Hendrina and Komati have been shut down prior to the 50-year life and put into reserve storage. The shutting down of these power plants reduces the cumulative emission load and pollution in Mpumalanga. The emissions load will continuously decrease, ensuring that health impacts from Eskom's power stations in the Highveld will not increase.

The retrofits listed above are over and above the emission abatement technology already installed at Eskom's power stations, which is:

- Electrostatic Precipitators (ESPs) at Matimba, Kendal, Lethabo, Matla, Kriel, Tutuka, Komati and 3 of the 6 units at Duvha. In addition, SO_3 flue gas conditioning plants have also been installed at those stations with ESPs, except Tutuka, to improve the efficacy of the same;
- Fabric Filter Plants (FFPs) at Majuba, Arnot, Hendrina, Camden, Grootvlei, Medupi, Kusile and 3 units at Duvha;
- Boilers with Low NO_x design at Kendal and Matimba;
- Low NO_x Burners (LNBs) at Medupi, Kusile, and 7 units at Camden;
- Flue gas desulphurisation (FGD) at Kusile;
- Ankerlig and Gourikwa are a low NOX design Open Cycle Gas Turbine (OCGT) plants, and
- Acacia and Port Rex are of an older design OCGT that do comply with the existing plant NOX limits.

Eskom applied and was granted a first round of postponements between 2014 and 2015. Since then Eskom has updated its emission reduction plan to include the enhancement of existing particulate matter abatement technology currently installed at Kendal, Matimba and Lethabo Power Stations.

Implementing the emission reduction plan and installing more efficient emission control technology will reduce Eskom's emissions. The shutting down of the older stations and increased use of the newer less emitting Medupi, Kusile and the renewable IPPs, will also result in a substantial decrease in Eskom's and South Africa's emissions over time. For example, it is projected that compared to a 2020 baseline that by 2030 Eskom's relative PM emissions will reduce by 51%, SO_2 by 22%, and NO_x by 27%[1]. By 2039 Eskom's relative PM emissions will reduce by 70%, SO_2 by 54%, and NO_x by 56%.

The retrofit schedule and projected emission reduction above clearly illustrates that Eskom has been and remains committed to implementing emission reduction technologies to improve air quality in South Africa.

Given its financial position and being cognisant of the air quality in the country, Eskom is proposing that the above is the 2020 Emission Reduction Plan for Eskom. The changes from the 2019 plan include, in terms of SO_2 proposing to implement a lower cost technology or no technology at Medupi and no pilot studies at Kendal or Matimba. Further, since the NO_x ambient standards are already in general compliance in Mpumalanga and the Waterberg, Eskom proposes not to proceed with the planned installation of low NO_x burners at any further stations beyond Camden.

Eskom's 2019 Emission Reduction Plan was estimated to cost R52 billion[2] (2018 overnight cost, R 72 billion nominal cost) over the next 10 years. The proposed 2020 Eskom Emission Reduction Plan will reduce the cost to R 15 billion (overnight cost 2018 base, R16 billion nominal 2020-2030).

3 ESKOM'S APPROACH TO A JUST ENERGY TRANSITION

The changing energy landscape globally and domestically plays an important role in Eskom's plans for medium to long term sustainability. The changing landscape is itself influenced by the growing need to address climate change in a just manner. Given South Africa's vulnerability to climate change and its commitment to the Paris Agreement as well as its commitment to the Sustainable Development Goals, Eskom's approach is to address climate change holistically in a just manner. The International Labour Organisation (ILO) "Guidelines for a just transition towards environmentally sustainable economies and societies for all" describes the complexity well -

[1] The estimated reduction is based on units running at the allowable limit value and changes following an upgrade/retrofit or unit shutdown.

[2] R46 billion is the previously reported figure which included a Medupi wet FGD estimate of R26 billion. Updated costs showed Medupi FGD to be R32 billion (capital including contingency, excluding CPA, IDC, and Forex), so ERP 2019 figure is revised up by from R46 billion by R6 billion to R52 billion.

“A just transition for all towards an environmentally sustainable economy… needs to be well managed and contribute to the goals of decent work for all, social inclusion and the eradication of poverty.” This narrative underpins Eskom’s holistic approach to a lower carbon future in a just manner. We are therefore cognisant of Eskom’s role in supporting the Just Energy Transition, not only supplying electricity, which is the economic backbone of the country, but also of the impact of our environmental footprint and our social responsibility towards those affected by our operations. The suite of policies, activities and initiatives that contribute to the Eskom Just Energy Transition strategy, therefore, is geared towards having a positive impact on our finances, the society we operate in and on the environment.

For this reason, Eskom is developing a Just Energy Transition Strategy detailing:

- Eskom’s commitment to a lower-carbon future;
- How the repurposing and renewables plans contribute to meeting this target;
- The impact of this approach on all environmental goals – air quality, carbon emissions, water, etc. (no compromise on environmental integrity); and
- The impact of this approach on socio-economic factors – including dealing with shutting down of coal plants

The elements of a Just Energy Transition are being integrated into various pieces of work currently underway in the organisation including:

- Six (6) stations with in excess of 10 000 MW of coal-fired capacity is expected to be shut down by 2030, based on a 50 year technical life of plant. The pace of this transition must consider the capacity of the electricity supply system, elements of the value chain, employees, suppliers and communities surrounding the power station to adapt to this change. Eskom’s strategy is to redeploy and reskill affected employees, support local municipalities and actively pursue economic opportunities for local communities.
- Developing comprehensive and implementable social plans for each power station that will be shut-down.
- Investigating how we can repurpose power plants and/or power plant sites, including through the deployment of renewables repurposing with gas and assessing the use of the sites for other industries
- Given the shut-down of plants the need to develop new revenue and employment pathways plus the desire to reduce its carbon footprint and other pollutants, Eskom aspires to expand its renewables portfolio significantly through large scale grid-connected wind and PV plants at selected greenfield sites, power stations and offices. This includes the investigation of options available in the Lephalale area.
- Additionally, Eskom will investigate rooftop PV on a commercial basis and adopt energy storage solutions to provide balance to the system.
- Eskom has also extended an Expression of Interest to the public to provide further ideas for repurposing.

In looking at these various options and the development of Eskom’s overall Just Energy Transition Roadmap, we are also assessing the options for alternative financing, including climate financing. The drive towards a Just Energy Transition will result in a reduction in Eskom’s environmental and air quality impacts overtime but given the need to ensure an adequate energy supply for South Africa going forward the process is not a short-term one and it will require that Eskom remain a financially viable entity.

Historically the South African economy was built on coal as low-cost energy to power a primary commodity economy. Despite the growth of the services sector, the structural underpinnings of the economy have not changed and are ill-suited to this global transition that is underway. In a context where the world's largest economies and key trading partners are beginning to decarbonise, these global changes and the vulnerability of our economy, exacerbated now by COVID-19, if ignored, threatens to retard economic growth further in South Africa increasing poverty, unemployment and inequality. In this context, the risks related to a just energy transition to a lower-carbon economy are immense but not insurmountable if we address this as a collective (business, government, civil society and labour unions). Therefore, in addition to these efforts, Eskom is engaged in national efforts through government and business to determine the Just Energy Transition pathway for South Africa.

In addition to the above Eskom is managing its operation in compliance with the national requirements in respect of climate change. Eskom has, as is legally required, submitted it's Pollution Prevention Plan in respect of CO_2 emissions (GN 513 of July 2017) and reports its CO_2 emissions annually in terms of the National Green House Gas reporting requirements (GN 275 of April 2017).

4 REQUESTED POSTPONEMENT EMISSION LIMITS

Medupi power stations current emission limits as defined in Medupi's Provisional AEL (ref: 12/4/12L-W2/A4 issued by the Limpopo Department of Economic Development, Environment and Tourism on 24 July 2019) as well as the postponement application decision granted by the National Air Quality Officer (DEA) in 2018 (LP/ESMT/ WDM/20170825) are shown in Table 1. The alternative emission limits that are requested for Medupi during normal operating conditions based on the postponement of the new plant limits for SO_2 are also shown in Table 1.

Table 1: Current and Requested Emission Limits for Medupi

Point source SV0002, 0011,0012, 0013,0014 and 0015	Current Limit (from AEL)			Requested Emission Limits+		
	Limit value	Averaging period	Date to be achieved by	Limit value	Averaging period	Date to be achieved by
Particulate Matter (PM)	50	Daily	1 April 2015	50	Daily	1 April 2020
Sulphur Dioxide (SO_2)	3500	Monthly*	1 April 2015	**4000**	**Monthly**	1 April 2020

Point source SV0002, 0011,0012, 0013,0014 and 0015	Current Limit (from AEL)			Requested Emission Limits+		
	Limit value	Averaging period	Date to be achieved by	Limit value	Averaging period	Date to be achieved by
				To be proposed based on technologies		1 April 2030
Nitrogen Oxide (NO_x)	750	Daily	1 April 2015	750	Daily	1 April 2020

+The requested alternate emission limits above are in mg/Nm³ at 273 K, 101.3 kPa, dry and 10% O_2.
** Limit as per 2018 MES application grant (LP/ES-MT/WDM/20170825)*

In summary, the application submitted for Medupi is:

i. An alternative monthly SO_2 limit of 4000 mg/Nm³ from 1 April 2020 until 31 March 2030.
ii. An alternative monthly SO_2 limit from 1 April 2030 until decommissioning will be proposed based on the SO_2 emission reduction technology selected if a suitable technology is identified.

Medupi will comply with new plant standard for PM and NO_2 and no change in respect of these pollutants is requested. In terms of the existing license and postponement decisions, it is understood that the previously granted postponements of the SO_2 limit will remain in place until 2025 as a minimum (compliance to a monthly limit of 3 500 mg/Nm³). Based on the techno-economics and with due consideration of the issues described in this application, any additional measures other than what was committed to above and the emission limits requested are not considered financially viable. The monthly averaging period has been requested due to the variability in coal quality which results in days where a daily limit is exceeded and others where the emissions are below the daily limit.

It is requested that the alternative limits only apply during normal working conditions, and not during start-up or shut-down, upset conditions and maintenance periods.

Eskom recognises that the authorities have an option to establish an emission load instead of emission limits. Given the complexities of calculating an emission load, Eskom has not phrased its application in terms of load but is willing to engage with the authorities in respect of load if this is deemed acceptable.

The emission limits proposed in this application are informed by plant design, plant operations, coal quality and the existing regulatory requirements. Eskom reserves its rights to amend its application subject to any change in the legislated emission limits. Practically a changed emission limit may allow Eskom to review its technology choices or plant operations that could result in substantial cost and resource savings and reduced environmental impacts that would be advantageous for Eskom and South Africa and warrant a revised MES application.

As indicated a strict interpretation of the amendment of the MES regulations made in 2018 may potentially restrict the ability of the authorities to grant some or all of the elements of the postponement and alternative limit request above. If this is the case then this application and the request above should also be considered as a request to the Minister of DEFF for exemption from from the application of section 21(3) of NEMAQA and the Minimum Emission Standards contained in the Listed Activities regulations as allowed for in terms of section 59 of NEMAQA.

5 LEGAL BASIS FOR DECISION-MAKING

5.1 National Ambient Air Quality Standards

Poor air quality has been recognised as an environmental and health problem in various parts of South Africa. In an effort to address the issue, the National government has published the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004). In order to better manage air quality government has published standards for ambient or local air quality, the National Ambient Air Quality Standards (NAAQS). The NAAQS define the permissible amount or concentration of a particular substance in the air and, in cases, the number of times this amount may be exceeded. The NAAQS represents the nationally approved tolerance level of environmental risk in respect of human exposure to emission pollutants.

5.2 Minimum Emission Standards

To further control air quality government identified activities, which must obtain Atmospheric Emission Licenses (AEL) to operate and established the Minimum Emission Standards (MES) to limit the emission levels at which these industries may emit from their operations. The logic being that by imposing limits on what industry may emit (point source limits) this will result in acceptable air quality at the ambient or local level as defined by the NAAQS.

All the Eskom Power Stations hold a valid Atmospheric Emission Licence for electricity production, the storage and handling of coal, and the storage of petroleum products in terms of the listed activities promulgated in the Minimum Emission Standards (GNR 893 dated 22 November 2013, and as amended in GNR 1207 on 31 October 2018) under the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA). The AEL specifies permissible stack emission concentrations for NO_x, SO_2 and for PM. The licence specifies a number of compliance conditions as well as conditions for emission monitoring and management of abnormal releases.

In terms of NEMAQA, all of Eskom's coal- and liquid fuel-fired power stations are required to meet the Minimum Emission Standards (MES) contained in GNR 893, and as amended in GNR 1207, promulgated in terms of Section 21 of the NEMAQA. GNR 893 does provide arrangements in respect of the requirement for existing plants to meet the MES and provides that less stringent limits had to be achieved by existing plants by 1 April

2015, and more stringent “new plant" limits need to be achieved by existing plants by 1 April 2020. The MES are listed in the table 2.

At the time of publication of the initial and subsequent amendments to the MES limits, Eskom submitted comprehensive comments indicating to the authorities that the proposed legislation was onerous and would negatively impact on the provision of electricity. Eskom proposed that existing plant (which includes Medupi and Matimba) should not be required to comply with new plant standards but rather allow decommissioning in terms of the Integrated Resource Plan at 50 years. This approach would result in a steady decline in emissions resulting in an improvement in ambient air quality in the relevant air sheds but would not force early decommissioning and would not require Eskom to retrofit power stations which were relatively near to decommissioning or as with Medupi were already designed and planned.

Table 2: Minimum emission standards for Category 1: Combustion Installations, sub-category 1.1: Solid Fuel Installations and sub-category 1.2: Liquid fuel installations

		Subcategory 1.1: Solid fuel		**Sub-category 1.2: Liquid fuel**
Description:		Solid fuels combustion installations used primarily for steam raising or electricity generation.		Liquid fuels combustion installations used primarily for steam raising or electricity generation.
Application:		All installations with design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used		All installations with design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used.
Substance		**Plant status**	mg/Nm^3 under normal conditions of 10% 0_2, 273 Kelvin and 101,3 kPa.	mg/Nm^3 under normal conditions of 15% 0_2, 273 Kelvin and 101,3 kPa.
Common name	**Chemical symbol**			
Particulate matter	N/A	Existing	100	75
		New	50	50
Sulphur dioxide	SO_2	Existing	3 500	3 500
		New	1 000	1 000
Nitrogen oxides	NO_x	Existing	1 100	1 100
		New	750	250

Further, the Amendments to the listed activities and associated minimum emissions standards identified in terms of section 21 of the NEMAQA, GN 1207 31 October 2017, (also in the 2017 National Framework for Air Quality Management in the RSA (GN 1144, 26 October 2018)) provides certainty regarding postponement or suspension of compliance timeframes in the following order:

(11A) An existing plant may apply to the National Air Quality Officer for a once-off postponement with the compliance timeframes for MES for new plant. A once-off postponement with the compliance timeframes for the MES for new plant may not exceed a period of 5 years from the date of issue. No once-off postponement will be valid beyond 31 March 2025;

(11B) An existing plant to be decommissioned by 31 March 2030 may apply to the NAQO before 31 March 2019 for a once-off suspension of compliance timeframes with MES for new plant. Such an application must be

accompanied by a detailed decommissioning schedule. No such application shall be accepted by the NAQO after 31 March 2019;

(11C) An existing plant that has been granted a once off suspension with the compliance timeframes must comply with MES for existing plant from the date of granting the application and during the period of suspension until decommissioning.

(11D) No postponement of compliance timeframes or a suspension of compliance timeframes shall be granted for compliance with the MES for existing plant.

(12A) a) An existing plant may submit an application regarding a new plant standard to the National Air Quality Officer for consideration, if the plant is in compliance with other emission standards but cannot comply with a particular pollutant or pollutants.

b) An application must demonstrate previous reduction in emissions of the said pollutant or pollutants, measures and direct investments implemented towards compliance with the relevant new plant standards.

c) The National Air Quality Officer, after consultation with the Licensing Authority, may grant an alternative emission limit or emission load if:

- there is material compliance with the national ambient air quality standards in the area for pollutant or pollutants applied for; or
- the Atmospheric Impact Report does not show a material increased health risk where there is no ambient air quality standard.

5.3 Exemption applications

Section 59(1) of NEMAQA provides that any person may, in writing, apply for exemption from the application of a provision of the "Act" to the Minister. Specific exclusions are specified in section 59(1)(b) of NEMAQA, which do not apply to Eskom[3]. Eskom believes it is legally entitled to apply for exemption from compliance to the MES compliance time frames and limits if necessary and may do so if additional legal or technical issues arise which make compliance with this application no longer possible or place approval of the application at risk, as is presently the case.

5.4 Regulatory Requirements

In terms of Section 14(1) of the NEMAQA, the Minister of Environmental Affairs ("Minister") must designate an officer in the Department of Environmental Affairs (DEA) as the National Air Quality Officer. In this regard, Dr Thuli Khumalo has been designated by the Minister as the current National Air Quality Officer. Section 14(4)(b) of the NEMAQA provides that the National Air Quality Officer may delegate a power or assign a duty to an official in the service of his/her administration. It is our understanding that no such delegation has been made

[3] Section 59(1)(b) does not allow exemption applications in respect of sections 9 (relating to national standards, an exemption of which is not sought by Eskom), section 22 (relating to the obligation to secure an AEL, an exemption of which is not sought by Eskom) and section 25 (relating to the consequences of being declared a controlled emitter, an exemption of which is not sought by Eskom).

for the area of jurisdiction in which the power station is located. Accordingly, Eskom submits this application to the National Air Quality Officer (NAQO).

In terms of Paragraph (12)(a) – (c) of GNR 1207 of 22 November 2013 (the Regulations) as amended by GNR 1207 of 31 October 2018, the application must include:

1. An air pollution impact assessment compiled following the regulations prescribing the format of an Atmospheric Impact Report (AIR) (as contemplated in Section 30 of the NEMAQA), by a person registered as a professional engineer or as a professional natural scientist in the appropriate category;
2. A detailed justification and reasons for the application; and
3. A concluded public participation process undertaken as specified in the National Environmental Management Act and the Environmental Impact Assessment (EIA) Regulations made under section 24(5) of the aforementioned Act.

In respect of these requirements we have attached:

1. As Annexure 1, a copy of the AIR prepared in August 2020 for this application. The AIR provides, *inter alia*, an assessment of how ambient air quality is likely to be affected by Matimba and Medupi's requested emission limits by utilising atmospheric dispersion modelling.
2. Detailed justifications and reasons for the application (see Section 6 below) and,
3. A comprehensive report on the public participation process followed and associated documentation (Annexure 2).

5.5 Changes in Regulatory Framework

In October 2018 the 2017 National Framework for Air Quality Management in the Republic of South Africa and the Amendment to Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of NEMAQA were published. There was, prior to October 2018, no requirement for Eskom to complete an immediate application for Medupi as the station had a valid postponement decision until 2025. Eskom was unable to complete an application by the deadline of March 2019 and as such requested approval for the late submission of an application in March 2019. Approval to submit an application by November 2019 was granted to Eskom in October 2019 by the Minister of Environment, Forestry and Fisheries. Eskom complied with this request and undertook to submit an updated AIR and Public Participation report when these were available. The updated AIR completed in August 2020 and an updated public participation report finalised in August 2020 are attached as appendices in support of this application.

5.6 The Need to Amend Variation Requests

In terms of timing, Eskom is required to submit an AEL variation request in parallel to this application, and a draft of this application is available for review (Annexure 3). The variation request is prepared based on the assumption that the requested MES postponement and alternative limits are granted by the NAQO. If the

NAQO or Ministers decision is substantially different from the requested postponement application, Eskom reserves its right to amend its variation request. Once a decision has been received on this application, an AEL variation request will be submitted on the South African Atmospheric Emission Licencing & Inventory Portal as is required.

5.7 Discussion on legal aspects

Eskom has engaged with the DEFF since early 2000 regarding the MES. Each time legislation was changed or regulations were published, Eskom submitted substantial comments, which raised with the DEFF the risk of stranded assets, increased use of water that was not available in South Africa, the availability, cost, and environmental impact of sorbent (limestone or lime), and a negative cost-benefit. Despite this formal engagement, the DEFF has continued to tighten the legislation towards early decommissioning of coal-fired power stations even though (from a greenhouse gas perspective) a 50-year life was considered when South Africa made its' nationally-determined contribution under the Paris Agreement. Eskom believes the legal framework may now be so restrictive that it has now no other legal mechanism than an exemption request, in terms of Section 59(1) of the NEMAQA, to ensure the continued legal operation of its power stations. Key developments in terms of this history of engagement and legal issues include the following.

In June 2018, the DEFF released draft regulations in terms of the Air Quality Framework and Minimum Emission Standards. Eskom submitted comprehensive comments, indicating to the DEFF that the proposed legislation was unreasonably onerous and would negatively affect the provision of electricity, among other elements if the DEFF were to promulgate it. Eskom again proposed that already existing plants ought not to be required to comply with new plant standards, but rather that decommissioning ought to be allowed in terms of the Integrated Resource Plan at 50 years. This approach would result in a steady decrease in emissions, resulting in an improvement in ambient air quality in the relevant air sheds, but would not force early decommissioning and would not require Eskom to unreasonably retrofit power stations that were relatively close to decommissioning.

In October 2018, five months before Eskom was required to submit the 2019 Postponement Applications, the DEFF published the new regulations, which had far-reaching implications for Eskom.[4]

Noting the 1) significant investment already expended to achieve emission reductions across the Eskom fleet; 2) Eskom's current emission reduction plan; and 3) the general state of air quality in the affected air sheds, Eskom submitted postponement applications in 2018, 2019 and 2020, which included requests for "alternative emission limits" as permitted in the regulations.

Further legal advice and engagement with DEFF indicated that with a strict interpretation of the MES regulations and given a lack of direct investment in specific emission reduction technologies at an individual

[4] Government Notice 1207 in Government Gazette 42013 of 31 October 2018.

power station level, the department may be unable to grant the requested “alternative emission limits”. Therefore, the investment in the Eskom fleet is not considered relevant to individual power stations.

Legal compliance is of paramount importance to Eskom, which is why it has sought to exhaust the postponements and the above-mentioned attempts to ultimately allow for compliance with the Minimum Emission Standards. It has become clear to Eskom that it is no longer feasible to continue applying for postponement of the Minimum Emission Standards because the obstacles that stand in the way of Eskom’s compliance with the Minimum Emission Standards or any historic variations to these in terms of the Postponement Decisions will, based on existing knowledge, become insurmountable in the short term. A comprehensive, reasonable, tailor-made approach is required if Eskom is to be in a position to operate lawfully and if it is to achieve compliance with the Minimum Emission Standards within a reasonable time frame.

It is emphasised that the section in terms of which the Minimum Emission Standards were published provides a statutory mechanism that contemplates flexibility as opposed to rigidity in their application to existing Combustion Installations. In this regard, section 21(3)(b) of NEMAQA allows the Minister, when publishing the Minimum Emission Standards, to provide not only for transitionary mechanisms but also for special arrangements in respect of existing Combustion Installations. The position of Eskom is complicated, and it is requested that the rigid approach, specifically with regard to the 2018 amendment, to the application of the Minimum Emission Standard by 1 April 2020, be reviewed.

As a result, Eskom is requesting the Minister responsible for environmental affairs to grant an exemption from the application of section 21(3) of NEMAQA and the Minimum Emission Standards contained in the Listed Activities Regulations to allow Eskom more than the allocated 10 years of transition to comply with the Minimum Emission Standards, if no other legal mechanism to allow the continued operation of the station at the requested limits exists. This will allow Eskom the time and capital it will need to focus on stabilising itself and the South African energy supply, while working towards a Just Energy Transition and an overall reduction in emissions with the closure of older power stations, the reduction in emissions at existing power stations, and the introduction of greener energy sources.

Section 59(1) of NEMAQA provides that any person may, in writing, apply to the Minister for exemption from the application of a provision of the “Act”. Specific exclusions are specified in section 59(1)(b) of NEMAQA that do not apply to Eskom and do not form a part of this exemption application.[5]

The “Act” is defined in section 1 of NEMAQA to include any regulations made in terms of NEMAQA. The Minimum Emission Standards are included in such a regulation, as are the Listed Activities Regulations. Accordingly, it is permissible to apply for exemption from the application of a provision of these Listed Activities

[5] Section 59(1)(b) does not allow exemption applications in respect of section 9 (relating to national standards, an exemption from which is not sought by Eskom), section 22 (relating to the obligation to secure an AEL, an exemption from which is not sought by Eskom), and section 25 (relating to the consequences of being declared a controlled emitter, an exemption from which is not sought by Eskom).

Regulations. Specifically, it is permissible to apply for an exemption from the application of the emission limits and the compliance dates imposed by these regulations by way of the Minimum Emission Standards.

It is important to emphasise that Eskom is not seeking an exemption from the application of section 22(a) of NEMAQA requiring it to secure the AELs, but rather an exemption from having to fully comply with the minimum emission thresholds, where deemed unreasonable, set out in the Minimum Emission Standards. The technical reasons for this exemption request are presented in the following sections.

6 REASONS FOR THE APPLICATION

The reasons for this application are discussed below but include the following:

(i) Coal quality and the high sulphur content of Waterberg coals;
(ii) Delays in FGD project timeframes and further study time requirements;
(iii) The cost of SO_2 reduction technologies and Eskom's financial position;
(iv) Water use associated with SO_2 reduction;
(v) Waste, sorbent and energy impacts of SO_2 reduction technologies;
(vi) The state of air in the Waterberg and the predicted impact of Eskom's application;
(vii) The potential impact on national electricity supply; and
(viii) Eskom's Just Energy Transition Strategy and climate change response.

None of these reasons should be seen as exclusive (that is, it is not one reason alone that prevents compliance with the MES and justifies this application, but rather a combination of all the above factors).

Decision making in respect of an application such as this is not simple and requires the balancing of the interests and rights of multiple parties. The Constitution of the Republic of South Africa recognises that there is an interrelationship between the environment and development. There is a need to protect the environment, while simultaneously recognising the need for social and economic development, and Eskom believes that this application does this.

6.1 Coal Quality

Monitoring of coal quality at the station has shown that a daily SO_2 emission limit of 3500 mg/Nm^3 is exceeded sporadically at Medupi when batches of high sulphur coal are received. The root cause of the high SO_2 emissions experienced is the high sulphur content in the coal supplied to the station by the Exxaro Grootegeluk Coal Mine. The high sulphur content is an inherent property of the coal available in the Waterberg coal seams. In the short- to medium-term, there is no simple remedy to the situation, and all potential solutions bring along with them significant operational, environmental and financial implications. Load losses, coal beneficiation practices, alterations to existing coal contracts and options to source coal from other mines are all options that have been looked into to find potential solutions but have proven not to be feasible. Current initiatives Eskom is

working on to better manage the quality of coal which is fed into the plant include: implementing an online analyser on the feed conveyor to better manage coal quality within the coal stockyard; establishing a high-level reclaimer to allow recovery from better quality stockpiles, and engaging with the mine to enable direct feeding of lower sulphur coal directly to the plant during periods of high SO_2 emissions. If SO_2 emissions are to be reduced, FGD or another emission reduction technology will ultimately be required.

Given the variability in coal quality and the impact it has on SO_2 emission levels Eskom believes it prudent to request a monthly SO_2 emission limit rather than a daily one as this will provide the station more flexibility in supporting compliance to the limit. Further, given that on occasion, the high sulphur content of the coal results in emissions peaking above 3500 mg/Nm^3, it is considered necessary to request an emission limit of 4000 mg/Nm^3.

6.2 Delays in project time frames and future time requirements

It was planned to install FGD at Medupi six years after each unit is commissioned (so the first unit, Unit 6, which was commissioned in 2015, would be retrofitted in 2021 with complete installation being completed by 2025). The FGD project delivery time frame has been extended due to various factors including extended and time-consuming governance, funding and commercial processes; environmental licencing requirements especially the need for separate gypsum and ash disposal facilities; plant process issues at Medupi; lessons learnt in terms of more realistic project schedules and ensuring critical hold points. The most recent planning indicated that FGD implementation at Medupi would have been possible between 2028 and 2030.

As indicated and discussed further below Eskom believes it is no longer appropriate for it to implement FGD at Medupi. Eskom is presently investigating alternative SO_2 reduction technologies which would be financially and resource less intensive. Assuming Eskom is able to identify and make a decision on an alternative technology by 2022 it is likely that it would only be possible to implement by 2030 (this date will need to be confirmed based on the technology chosen, however).

6.3 The cost of SO_2 reduction technologies and Eskom's financial position

Eskom estimates that SO_2 emission reduction at Medupi using the previously planned wet Flue Gas Desulphurisation (FGD) technology will have a capital cost in excess of R32 billion (real overnight cost 2018 base or approximately R40 billion nominal cost between 2020 and 2030, excluding financing costs) with operational costs running at R700 million per annum.

While several technologies for SO_2 reduction exist, Eskom's analysis shows wet FGD to be the most viable to achieve an MES limit of 1 000 mg/Nm^3. The other technology frequently cited for SO_2 reduction, direct sorbent injection (DSI), can achieve emission reduction of between 20% and 50%, but would not bring Medupi into MES compliance. Furthermore, while DSI has a reduced capital outlay, estimated at R4 billion real (R10 billion nominal cost), it has very high operational costs, estimated at between R3,5 billion to R5,5 billion per annum.

Eskom believes it now necessary for it to undertake further studies in respect of SO_2 emission reduction technologies to determine what would be a more cost-effective and generally appropriate solution for Medupi.

Compliance with the MES across the Eskom fleet has been estimated to cost in excess of R187 billion (real overnight 2018 costs, R300 billion nominal cost) and would add 7% to 10% to the electricity tariff if cost recovery is to be obtained, which would be critical to keeping Eskom operating as a going concern[6].

A health focused cost-benefit analysis completed in support of Eskom's Highveld MES applications has clearly shown that given the very high costs of FGD it's implementation in that context is not appropriate from a cost-benefit perspective.

Eskom's financial health has deteriorated over the years due to above-inflationary cost increases and the non-cost-reflective price of electricity, coupled with an ambitious capital expansion plan. As a result, most financial ratios have trended negatively, with the EBITDA margin of 20% as at 31 March 2020, while the margin should at least be more than 35%. The debt-service coverage ratio is 0,5, indicating that Eskom has to borrow money to settle debt, interest, and principal. Although there has been some improvement in the financial ratios principally through cost management initiatives, these are still far below the required norm.

Eskom has in recent months had some successful court cases in respect of improving the level of tariff recovery, but details of these are to be finalised. However, whilst emission capital projects are often prioritised when funds become available due to their statutory nature, this can result in an underfunding of other critical business areas such that planned emission improvements are undermined.

As a result of its weakening financial position and the fact that Eskom relies mostly on debt financing, the shareholder had to provide support through an equity injection and through providing loan guarantees. Given the increasing fiscal constraints faced by South Africa, this situation is unsustainable.

6.4 Water use

Water is a limited resource in South Africa, and the implementation of FGD at Medupi is not an appropriate decision for a water-scarce country. Both wet and semi-dry FGD are critically dependant on large quantities of water being available at the power stations where FGD is deployed. Investigations undertaken for Medupi indicate that the implementation of FGD will increase its water requirement up to 9,6 Mm^3/annum. Wet FGD approximately triples the water consumption of a dry-cooled power station; semi-dry FGD more than doubles the water consumption of a dry-cooled power station (a wet cooled power station uses more than 10 times the amount of water of an equivalent dry-cooled power station. Typically 0.12 l/kWh for dry cooled to 2 l/kWh for wet cooled). Medupi and Matimba Power Stations are dry-cooled power stations, and the effect of installing

[6] Assuming that wet FGD is installed on the 5 newest stations excluding Kusile, and semi-dry FGD is installed on the rest of the coal-fired fleet, excluding stations which will be decommissioned by 2030. The October amendment of the MES for SO_2 new plant to 1000 mg/Nm^3 will require a revision of technology choices.

FGD would be to undermine the gains in water use minimisation from dry cooling. Currently, there is enough water available to operate on FGD on three of the six units at Medupi Power Stations. Additional water will become available when the Mokolo-Crocodile West Transfer Scheme Phase 2A has been completed, which is currently scheduled to deliver water in January 2026. A final environmental approval on the scheme is, however, yet to be granted which could delay the availability of the water even further.

The water demands of FGD are thus significant across the power stations in Eskom's fleet and will increase the water demand by some 59 million m^3/annum – a 20% increase in the combined water consumption of Eskom's power stations[7].

The argument is also not just one of having water available in the catchment. It is also determining whether FGD is a judicious use of what is a scarce resource in South Africa in the face of multiple competing demands for that same resource.

6.5 Waste, sorbent and energy impacts

Assuming wet FGD was operated at Medupi, it would not be without negative environmental consequences:

- Up to 1.5 million tons of sorbent (limestone) per annum is required to operate the FGD at Medupi. The main source of the sorbent is the Northern Cape, so the sorbent would need to be transported over hundreds of kilometres, preferably by rail or otherwise by road. The transport of the sorbent would result in environmental impacts, notably greenhouse gas emissions, and fugitive dust emissions. An increase in truck traffic would also result in an increase in driver mortalities, as has been observed in association with coal transport in Mpumalanga.
- Up to 2.7 million tons of gypsum will be produced per annum as a by-product of the FGD process. If a high-quality limestone is used, high-quality gypsum can be produced by wet FGD, and this could be taken up by the market for e.g. wallboard production. Lower-grade gypsum can also be used for agricultural purposes. However, if there is not sufficient demand from the market, the gypsum will need to be disposed of in which case it would need to be managed carefully to ensure that there are no impacts on groundwater or air quality (from fugitive dust emissions).
- Medupi is expected to produce an additional approximately 400 000 tons of CO_2 per annum, as the wet FGD process directly produces CO_2 as a by-product through the reaction: $SO_2 + CaCO_3 \rightarrow CaSO_4 + CO_2$. In addition, the electricity output of Medupi would be reduced by around 1% due to the additional auxiliary power requirements of the FGD, and correspondingly the relative CO_2 emissions would increase by 1%.

[7] Assuming that wet FGD is installed on the 5 newest stations excluding Kusile, and semi-dry FGD is installed on the rest of the coal-fired fleet, excluding stations which will be decommissioned by 2030. The October amendment of the MES for SO_2 new plant to 1000 mg/Nm^3 will require a revision of technology choices.

Alternative technologies such as DSI would also have environmental and resource impacts, and initial estimates put sorbent use from DSI at in excess of 2.4 million tons/annum, water use would, however, be substantially decreased to only 766 m^3 per annum.

6.6 The state of air in the Waterberg region

As part of the application process detailed Atmospheric Impact Reports assessing the state of air as monitored and as predicted based on dispersion modelling using the emission levels associated with the application have been prepared (Annexure 1). Key aspects of these studies are highlighted below.

Present monitored air quality results

Three Air Quality Monitoring Stations (AQMS) are located close to Medupi (viz. Marapong (Matimba), Medupi and Lephalale). The Medupi AQMS is located downwind of both Medupi (4 km) and Matimba (11 km) power stations, while the Marapong (Matimba) and DEFF Lephalale stations are upwind within nearby residential areas.

Verified data for the period 1 January 2016 to 31 December 2018 was assessed as part of the AIR for this application. Data availability for the pollutants measured was above 80% for the period 2016 to 2018 at all stations, for all pollutants with the exception of the DEFF Lephalale AQMS for the period 2017 that had a data availability of ~78%.

Exceedances of the daily NAAQS for PM10 were recorded at Medupi AQMS (for the period 2018) and Marapong AQMS (2016 and 2018). Daily PM2.5 NAAQS were exceeded at the Marapong AQMS for the period 2016 to 2018. The annual NAAQS for PM2.5 was exceeded at Marapong during 2018.

Measured SO_2 and NO_2 concentrations were in compliance with the NAAQS for all three years at all three sampling locations.

At all three AQMS the daily SO_2 concentrations show a typical industrial signature with increased concentrations around midday due to the break-up of an elevated inversion layer, in addition to the development of daytime convective conditions causing the plume to be brought down to ground level relatively close to the point of release from tall stacks. NO_2 and PM show increased concentrations in the morning and late afternoon, possibly associated with vehicle traffic and domestic fuel burning. These pollutants also show increased concentrations during winter, likely associated with the increased need for heating and lighting. Mining and dust from roads contribute to PM levels.

Additional monitoring data for the period December 2018 until April 2020 shows ambient CO and NO_2 concentrations at the monitoring site are well within their national ambient limits with no exceedances recorded Ambient PM10 and PM2.5 concentrations have exceeded their daily limits on several occasions during this period and show increase in winter and decrease in summer, but there is compliance with the NAAQS standards. The ambient SO_2 hourly limit and daily limit have been exceeded several times during the period under review, but there is compliance with the NAAQS standards in terms of the number of exceedances.

Dispersion modelling results

Medupi and Matimba are 6 km apart and as such to realistically assess the impact of the stations it is important to consider the cumulative impact of the stations. Key conclusions from the cumulative modelling scenarios are discussed below.

Five scenarios were simulated for cumulative (Matimba and Medupi Power Station) operations:

- Baseline Emissions – modelling conducted based on current operational inventory and impacts. This includes 3 units online for the Medupi Power Station and 6 units online for the Matimba Power Station.
- Future Baseline Emissions – modelling conducted based on current operations for the Matimba Power Station (6 units online) and proposed Medupi Power Station Operations at full capacity (6 units online).
- New Plant Minimum Emissions Standards – modelling conducted based on Matimba Power Station and Medupi Power Station theoretically complying with New Plant Standards.
- Alternative Emission Limits (2020-2030) – the emissions as requested by the Eskom Operations, where applicable and different from the scenarios above. The alternative limits are for SO_2 where the concentration of 4000 mg/Nm³ are requested for Matimba Power Station and Medupi Power Station.
- Alternative Emission Limits (post 2030) – the emissions as requested by the Eskom Operations, where applicable and different from the scenarios above. The alternative limits are for SO_2 where the concentration of 4000 mg/Nm³ are requested for the Matimba Power Station. The Medupi Power Station will meet the New Plant Minimum Emission Standards of 1000 mg/Nm³. This limit would be achievable with the Flue Gas Desulphurisation (FGD) in place.

(Eskom's request for monthly rather than daily limits has no impact from a dispersion modelling perspective given the nature of the modelling approach.)

Based on the conservative assumption that all PM is in the PM_{10} or $PM_{2.5}$ fraction, the simulated daily and annual PM_{10} and $PM_{2.5}$ concentrations were predicted to be below the NAAQS at all sensitive receptors for all scenarios.

Simulated hourly and annual NO_2 concentrations are predicted to be below the NAAQS at all offsite sensitive receptors within the study area for Baseline Emissions, Future Baseline Emissions, New Plant Minimum Emission Standards, Alternative Emission Limits (2020-2030) and Alternative Emission Limits (post-2030).

Simulated hourly CO concentrations are predicted to be below the NAAQS within the study area for all scenarios.

Simulated hourly and daily SO_2, ground-level concentrations for Baseline Emissions, Future Baseline Emissions, Alternative Emission Limits (2020-2030) and Alternative Emission Limits (post-2030) are predicted to exceed the NAAQS offsite at numerous sensitive receptors (schools, clinics etc.). The predicted annual average emissions for SO_2 are however in compliance to the NAAQS for all the above scenarios at all sensitive receptors with the exception of the Medupi AQMS (which is adjacent to the station).

Predicated hourly, daily, and annual SO_2 concentrations are below the NAAQS within the study area for New Plant Minimum Emission Standards.

Discussion on air quality findings

In reviewing the results of the modelling, it is important to note that whilst statistical analysis has shown the modelling to be academically acceptable it does clearly illustrate over prediction of high SO_2 levels especially in regards to shorter time periods such as hourly and daily results. The longer time periods such as the annual averages are generally considered more closely aligned to actual results.

The analysis of historical monitored data has illustrated that PM levels in the area are occasionally exceeded, but this is probably due to local low-level sources such as roads, burning and mining rather than Eskom's stack emissions. Both Medupi and Matimba will comply with the new plant MES for PM and dispersion modelling does not predict any exceedances of the PM standards as a result of power station emissions. Which is to be expected as Eskom will comply with the new plant MES limit for PM.

No exceedances of the NAAQS standard in respect of NO_2 were recorded historically or are predicted as a result of future power station emissions at offsite receptors. Which is also expected as Eskom will comply with the new plant MES limit for NO_2.

In respect of SO_2 monitoring has not shown exceedance of any of the NAAQS standards for any averaging periods between 2016 and 2020. Dispersion modelling for baseline emissions, which should align with the monitoring data, does, however, predict exceedances of the NAAQS for hourly and daily results, illustrating the trend for modelling to over predict short-term concentrations as highlighted above. The over prediction of short-term simulations may extend to the other scenarios. It is however not appropriate to say that no exceedances of the standard can be anticipated at sensitive receptors based on the hourly and daily modelling. The simulated annual average emissions for SO_2, a more reliable data set, does predict compliance to the NAAQS for all the scenarios at all sensitive receptors with the exception of the Medupi AQMS (adjacent to the station).

Given the above and noting the other factors on which the application is based Eskom believes the level of risk associated with the requested alternative emission limits should be viewed as acceptable by the NAQO.

The Waterberg-Bojanala Priority Area

Medupi is situated within the Waterberg-Bojanala Priority Area (WBPA), and Eskom has and is implementing substantial financial investment into its power stations in the region to promote acceptable air quality in the area. Medupi is being constructed to meet PM and NOx limits, and Eskom will be undertaking investigations to determine an acceptable SO_2 reduction technology.

6.7 The potential impact on the supply of electricity

Eskom's inability to obtain alternate limits in terms of this application would make it illegal and impossible to operate Medupi beyond its present postponement period (2025). This would result in 4800 MW no longer being

available on the national grid, which would be a significant risk in terms of the Eskom's ability to meet national electricity supply requirements.

6.8 Eskom's Just Energy Transition strategy and climate change response

As indicated, Eskom is developing a Just Energy Transition strategy aimed at addressing our impact on society, the environment, our finances and minimising our climate change impact. It is, however, a reality that Eskom and South Africa has invested billions in Medupi power station to date and it is only financially prudent for Eskom and South Africa to seek as high a return on this investment as practically possible as this will allow Eskom to allocate funds towards Just Energy Transition strategy initiatives. Decisions which limit the ability of Eskom to continue to operate Medupi will significantly impact on the companies' ability to continue to operate as a going concern and to effectively decommission it's older stations and drive towards a cleaner, greener economy for South Africa.

7 PUBLIC PARTICIPATION

The public participation (PP) process for this application followed the process specified in the NEMA Environmental Impact Assessment (EIA) Regulations for round 1 of PP. However, this was done differently for the second round given the restrictions posed by the COVID-19 pandemic. Round one of the PP process started in November 2019 and involved press advertisements, site notices, email notification of stakeholders and an open day. Press advertisements, site notices and email notification of stakeholders, including local councillors and community organisations, also occurred for the 2nd phase of public participation held from July 2020. Due to the COVID pandemic it was not possible to hold physical public meetings but three (3) virtual events were organised in line with DEFF guidance in respect of PP during the COVID pandemic. The public participation report, including a comment and response report is provided as Annexure 2 of this application.

In the second phase of public participation Eskom has specifically indicated in its public notifications and application documents that it may apply to the Minister of DEFF for an exemption from compliance to the MES requirements. As such Eskom believes it has adequately addressed the standard public participation requirements of an application submitted in terms of NEMAQA and that no further public participation in respect of the application is required.

8 EMISSION OFFSETS

Eskom is willing to implement emission offsets in areas where power stations impact significantly on ambient air quality, and where there is non-compliance with ambient air quality standards, as a condition of an approved postponement. Eskom has however completed various studies on the potential for offsets in the area impacted by Matimba and Medupi and has been unable to identify effective offset solutions, especially with respect to

SO_2 reduction. In the Highveld, where household coal burning is a significant pollution source, interventions targeted at reducing this source have been developed. In communities around the Limpopo stations household coal burning is not a major pollution source. Source apportionment work done shows local low-level sources such as quarries, mines and brickworks are responsible for local PM exceedances which are not associated with Eskom stack emissions. Eskom is working with Provincial and local authorities on educational and other targeted environmental, and emission awareness initiatives and remains committed to doing this going forward.

9 CONCLUSIONS

Eskom is committed to ensuring that it manages and operates its coal-fired power stations such that risks to the environment and human health are minimised, and a Just Energy Transition is facilitated whilst ensuring the company remains a going concern financially. As set out in the Constitution of the Republic of South Africa, there is the need to recognise the interrelationship between the environment and development. There is a requirement to protect the environment, while simultaneously recognising the need for social and economic development, and Eskom believes this application fulfils these requirements.

Medupi does comply with PM, and NO_2 new plant MES limits and no application in respect of these is made. In terms of SO_2, the Waterberg coals which feed the Medupi station are naturally high in organically bound sulphur which results in high SO_2 emissions from the station. Eskom had proposed to implement wet FGD at the station to bring the stations SO_2 emissions down and into compliance with the MES limits. Given Eskom's financial situation, the environmental and resource impacts of FGD, the status of air quality in the area and the other factors described in this report Eskom now believes that wet FGD is not an appropriate SO_2 reduction technology for Medupi, Eskom or South Africa. As such alternative SO_2 emission limits for the period until 2030 have been applied for, and future limits will be established based on planned investigations.

The reasons for this application are discussed in detail above but in summary, include the following:

(i) Coal quality and the high sulphur content of Waterberg coals;
(ii) Delays in FGD project timeframes and future time requirements;
(iii) The cost of SO_2 reduction technologies and Eskom's financial position;
(iv) Water use associated with SO_2 reduction;
(v) Waste, sorbent and energy impacts of SO_2 reduction technologies;
(vi) The state of air quality in the Waterberg and the predicted impact of Eskom's application;
(vii) The potential impact on national electricity supply; and
(viii) Eskom's Just Energy Transition Strategy and climate change response.

None of these reasons should be seen as exclusive (that is, it is not one reason alone that prevents compliance with the MES and justifies this application, but rather a combination of all the above factors).

Based on these reasons and specifically acknowledging the analysis of existing and predicted air quality Eskom believes that the application for alternative limits is appropriate and in line with the relevant Constitutional, policy and administrative requirements which require the balancing of environmental and economic issues in the pursuit of sustainable development and as such the application should be approved.

Eskom believes that the regulatory framework in respect of the MES may limit the ability of the NAQO to approve elements of this Eskom application as described above. As such Eskom is requesting the Minister responsible for environmental affairs to grant an exemption from the application of section 21(3) of NEMAQA and the Minimum Emission Standards contained in the Listed Activities Regulations to allow Eskom more than the allocated 10 years of transition to comply with the Minimum Emission Standards if no other legal mechanism to allow the continued operation of the station at the requested limits exists. This will allow Eskom the time and capital it will need to focus on stabilising itself and the South African energy supply, while working towards a Just Energy Transition and an overall reduction in emissions with the closure of older power stations, the reduction in emissions with existing power stations, and the introduction of greener energy sources.