

**ENERGY POLICY UNIT of the
Sustainable Energy & Climate Change Project**

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A project of Earthlife Africa Jhb

Date: 22 March 2006

Dear Ingrid Snyman and Ashlea Strong
Bohlweki Environmental
011 466 3849

Final Environmental Scoping Report for the proposed establishment of Coal-Fired Power Station in the Lephalale, Limpopo province

Dear Colleague

According to an "Update" produced and disseminated by Bohlweki dated 10 March 2006, a Final Scoping Report was submitted to the National Department of Environment Affairs and Tourism (DEAT) on 21 November 2005. The Scoping Report includes comments, suggestions, and concerns received during the Scoping phase and the draft review period.

I have searched for the Final Scoping Report on your website, to date the only document similar to what is suggested to be submitted to DEAT is a Draft Environmental Scoping Report date 03 October 2005.

I request to be emailed or sent the following documents, alternatively indicate where they can be downloaded from your website

- *Final Scoping Report*
- *Plan of Study for the EIA*
- *Draft Environmental Impact Assessment Report*

Yours for a just transition to sustainable energy and climate change response

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CC: Ashlea Strong; CC: matimba-b@bohlweki.co.za; nico.gewers@eskom.co.za; ;
wfourie@deat.gov.za

April, 18, 2006

P.O. Box 1178
Vorna Valley
Midrand
South Africa
1686

Dear Sir / Madam

Re: Environmental Scoping Report for a proposed establishment of a new coal-fired power station in the Lephalale area of the Limpopo Province.

I refer to the above environmental scoping report for a proposed establishment of a new coal fired power station in the Lephalale area of Limpopo province. Following a review of the document titled: Air Quality (Chapter 9) it is clearly apparent that potential mercury emissions are not considered to be potentially significant in your assessment of modeled air pollutants. Mercury originates in the atmosphere from the impurities that exist within coal during the process of combustion and are subsequently released into the atmosphere. Coal power stations are known to be significant emitters of anthropogenic mercury. Mercury emissions in US Coal power stations are estimated to reach up to 50 tonnes per year.

However, modern coal-fired power stations with BAT flue gas cleaning equipment have the potential to remove up to 90% mercury in emissions. No significant mention is made within this report of the mercury reducing abatement technology to be used.

We believe that although this proposed coal fired power station might be beneficial to society at large there are negative implications that need to be assessed and taken into account. These negative impacts may have potentially adverse affects on both human health and the environment.

In this regard please provide a motivation why mercury is not considered to be a significant potential component of air emissions and whether there is any particular reasoning behind this? groundWork considers coal combustion as an essential source of unregulated environmental mercury emissions.

Various studies have indicated that mercury has potential to cause known harmful health implications especially on the most vulnerable populations such as the unborn fetus and young children because they are more sensitive to the toxic effects of mercury. Health concerns indicated in previous studies included damage to the heart, kidneys, lungs, immune system and the brain.

groundWork

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 **Friends of the Earth International**
Member for South Africa

Furthermore we consider that cumulative emissions data of existing sources of pollution are fundamental to better assess and quantify health and environmental risks. The Matimba coal fired power station that exists in this vicinity will contribute significantly to air quality in this locality and measured emissions from this source will contribute to understanding existing emissions.

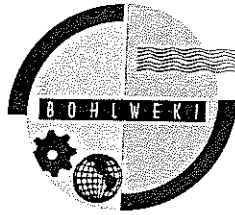
In light of the above concerns, does Eskom propose to better quantify the potential emissions of mercury that already exist in this locality and will result during the eventual operation of this new coal fired power stations?

We look forward to receiving a reply to the above comments.

Sincerely

Bobby Peek
Director, groundWork

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19 May 2006

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Attention: Mr B Peek

**RE: EIA FOR A NEW PROPOSED COAL-FIRED POWER STATION IN THE LEPHALALE AREA,
LIMPOPO PROVINCE**

Dear Mr Peek

Your letter date 18 April 2006 has reference.

As stakeholder participation is critical in the Environmental Impact Assessment (EIA) process, we thank you for your involvement in this process on behalf of groundWorks. We acknowledge and appreciate your interest in the EIA process for this project.

Attached please find a letter compiled by our air quality specialists in response to your letter. Please note that the Final Environmental Impact Report will be updated accordingly.

Please do not hesitate to contact us with any further queries in this regard.

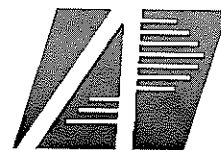
Kind Regards

Ashlea Strong
Environmental Scientist



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18 May 2006

ATTENTION: Ashlea Strong

Bohlweki Environmental
P O Box 1178
Vorna Valley
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Dear Mrs Strong,

SUBJECT: Response to Concerns raised by groundWork with regard to Mercury Emissions from the Proposed Coal-fired Power Station in the Lephallale Area

The concerns raised by groundwork related to mercury emissions from the existing and proposed coal-fires power stations and resultant health and environmental risks is acknowledged. We agree that mercury exposures have the potential to cause harmful health impacts including neurological effects, birth defects, kidney effects, respiratory failure, gastrointestinal tract damage (etc.), and that the quantification of additional sources of mercury emissions is important.

During the initial air quality impact assessment reference was made to site specific data for the estimation of heavy metal emissions from the existing Matimba Power Station and its associated tailings dam. The trace metal composition of fly ash and coarse ash generated at Matimba Power Station was obtained from a study undertaken previously by Eskom Holding's Chemical Technologies Division (Delpont, November 2003). This information was documented in the draft air quality impact assessment included in the draft EIR. It was however noted in the study that the quantification of trace metal releases was restricted to those studied and documented in the November 2003 study and that furthermore, data were unavailable to quantify gaseous trace metal releases from stacks. Although stack monitoring studies had been commissioned by Eskom Holdings previously the methods of monitoring are still being scrutinized and reliable data not yet available (*personal communication*, Gerhard Gericke, Chief Consultant, Water and Applied Chemistry, Eskom Research & Development, 10 March 2006). The draft air quality impact report noted that mercury represented the constituent most likely to be emitted in the gas phase. It was therefore concluded that the total emissions of mercury, and hence the associate risk, could not therefore be ascertained based on site-specific data in the same manner as the other metals had been quantified. This was specifically noted as being a limitation of the study.

Subsequent to the completion of the draft air quality impact report further work has been conducted in order to more accurately assess the potential for mercury emissions and associated impacts with reference being made to the mercury content of the coal and emission factors published internationally for power generation. These findings are summarized below and will be included in the final air quality impact study documented in the final EIR.

Quantification of Mercury Emissions

Mercury emissions were quantified in three ways to determine the maximum likely emissions, viz.:

- (a) Based on the total mercury content of the coal being combusted (Table1);
- (b) Based on emission factors from the European Environment Agency (EEA) Emissions Inventory Guidelebook – Combustion in Energy & Transformation Industries (15 February 1996) (Tables 2 and 3);
- (c) Based on emission factors included in the European Commission Integrated Pollution Prevention & Control (IPPC) Draft Document on Best Available Technology for Large Combustion Plants (November 2004) (Tables 4 and 5).

The relevant coal data and emissions factors are documented and the estimated emissions based on such presented in Tables 1 to 5 for the existing Matimba Power Station and proposed power station options (2400 MW and 4800 MW). In the application of the EEA emission factors reference was made to the more conservative of the two factors given (i.e. power station has dust control but no FGD in place). Similarly, in the application of the IPPC emission factors the emission factors given for power stations using an ESP but no scrubber desulphurisation were applied. A synopsis of the maximum mercury emission rates estimated on the basis of the coal composition, EEA and IPPC emission factors is given in Table 6.

Table 1. Predicted maximum possible mercury emissions based on the quantity of coal combusted / to be combusted and the mercury content of the coal as measured at the existing Matimba Power Station

Power Station	Coal (tpa)	Hg Content of Coal (%)	Maximum Possible Hg Emissions (tpa)
Current Matimba (max, 2004)	14,041,024	4.50E-05	6.32
Proposed (4800 MW)	17,117,436	4.50E-05	7.70
Proposed (2400 MW)	8,558,718	4.50E-05	3.85

Table 2. Mercury emission factors for coal-fired power stations from the European Environment Agency (EEA) Emissions Inventory Guidelebook – Combustion in Energy & Transformation Industries (15 February 1996)

Emission Control Measures in Place	Mercury Emission Factor for Coal-fired Power Stations	
	Minimum (g/Mg coal)	Maximum (g/Mg coal)
Dust control (particulate loading in clean gas stream of 50 mg/Nm ³)	0.05	0.2
Dust control & FGD (particulate loading in clean gas stream of 20 mg/Nm ³)	0.02	0.08

FGD – fluidized gas desulphurisation

Table 3. Estimated mercury emissions based on the emission factors given in European Environment Agency (EEA) Emissions Inventory Guidebook – Combustion in Energy & Transformation Industries (15 February 1996) as published for coal-fired power stations with dust control in place only (no FGD)

Power Station	Estimated Mercury Emissions	
	Minimum Hg Emissions based on Minimum Mercury Emission Factor given for Dust Controlled Power Stations (tpa)	Maximum Hg Emissions – based on the Maximum Mercury Emission Factor given for Dust Controlled Coal-Fired Power Stations (tpa)
Current Matimba (max, 2004)	0.70	2.81
Proposed (4800 MW)	0.86	3.42
Proposed (2400 MW)	0.43	1.71

Table 4. Mercury emission factors for coal-fired power stations from the European Commission Integrated Pollution Prevention & Control (IPPC) Draft Document on Best Available Technology for Large Combustion Plants (November 2004)

Emission Control Measures in Place	Mercury Emission Factor for Coal-fired Power Stations		
	Minimum Hg Emissions ($\mu\text{g}/\text{m}^3$)	Average Hg Emissions ($\mu\text{g}/\text{m}^3$)	Maximum Hg Emissions ($\mu\text{g}/\text{m}^3$)
Hg concentration in gas stream downstream of ESP	0.3	4.9	35
Hg concentration downstream of ESP and wet scrubber desulphurisation	0		5

Table 5. Estimated mercury emissions based on IPPC emission factors given for mercury concentrations downstream of an ESP (no wet scrubber desulphurization)

Power Station	Minimum Hg Emissions (tpa)	Average Hg Emissions (tpa)	Maximum Hg Emissions (tpa)
Current Matimba (max, 2004)	0.06	0.99	7.08
Proposed (4800 MW)	0.06	1.04	7.41
Proposed (2400 MW)	0.03	0.52	3.70

A synopsis of the maximum mercury emission rates estimated on the basis of the coal composition, EEA and IPPC emission factors is given in Table 6. The emissions estimated on the IPPC emission factors and on the basis of site-specific coal qualities are relatively similar, whereas the application of the EEA emission factors result in lower mercury emission estimates.

Table 6. Comparison of estimated mercury emissions based on mercury content of Matimba coal, IPPC emission factors and EEA emission factors

Power Station	Maximum Hg Emissions based on Coal Quality (tpa)	Maximum Hg Emissions based on IPPC Emission Factors (tpa)	Maximum Hg Emissions based on EEA Emission Factors(tpa)
Current Matimba (max, 2004)	6.32	7.08	2.81
Proposed (4800 MW)	7.70	7.41	3.42
Proposed (2400 MW)	3.85	3.70	1.71

Predicted Ambient Mercury Concentrations and Health Risk Potentials

In the simulation of ambient mercury concentrations and resultant air quality impacts reference was made to the maximum emission rates (i.e. 7.08 tpa for current Matimba operations, 7.70 tpa for the proposed 4800 MW power station configuration and 3.85 for the proposed 2400 MW power station configuration). Ground level mercury concentrations were predicted using the same atmospheric dispersion modeling approach as was documented in the air quality impact study. The maximum highest hourly, highest daily and annual average ground level mercury concentrations occurring as a result of existing Matimba Power Station emissions together with the proposed 4800 MW PF power station are given in Table 7.

Table 7. Predicted mercury concentrations given existing Matimba Power Station emissions together with emissions from the proposed 4800 MW PF power station with reference to applicable guidelines intended to protect human health.

	PREDICTED MERCURY CONCENTRATIONS GIVEN EXISTING AND PROPOSED 4800 MW POWER STATION OPERATIONS			
	Highest Hourly ($\mu\text{g}/\text{m}^3$)	Highest Daily ($\mu\text{g}/\text{m}^3$)	Highest Monthly ($\mu\text{g}/\text{m}^3$)	Annual Average ($\mu\text{g}/\text{m}^3$)
Predicted Maximum Total Hg GLCs ($\mu\text{g}/\text{m}^3$)	0.127	0.011	0.003	0.001
	RELEVANT GUIDELINES ($\mu\text{g}/\text{m}^3$)			
WHO Guideline Value				1.00
US-EPA inhalation reference concentration				0.30
Texas Effect Screening Levels	0.25			0.025
California RELs	1.8			0.09
DEAT Mercury Guideline (a)				0.04

REL – reference exposure level; GLCs – ground level concentrations; DEAT – Department of Environmental Affairs and Tourism

(a) Published in DEAT document "Technical Background Document for Mercury Waste Disposal" (2001).

The predicted maximum hourly, daily and annual average concentrations were well-within the most stringent of the guidelines given for public exposures to ambient mercury concentrations intended for the inhalation pathway (e.g. WHO, US-EPA inhalation reference concentrations, Californian RELs).

It is noted that the major pathway for mercury exposures is ingestion rather than inhalation. For this reason reference was made to the DEAT mercury guideline which was intended to be protective given multiple pathways of exposure. This guideline value (given as 0.04 $\mu\text{g}/\text{m}^3$ for chronic exposures) was derived

during a recent study initiated by the Department of Environmental Affairs and Tourism. This study included health-risk based research relating to human exposure to mercury and engineering reviews of treatment and disposal options for mercury waste. The purpose of such studies was twofold: (i) to support the drafting of national regulations for mercury waste disposal; and (ii) to provide specific guidance on how best to deal with the mercury waste stockpiled at the Thor Chemical's plant at Cato Ridge, Kwazulu-Natal. The health risk study determined that ambient long-term concentrations of mercury of lower than 0.04 µg/m³ would not result in unacceptable multi-pathway risk given local environments. This guidance is currently being used by the DEAT to assess the acceptability of mercury waste treatment and disposal options.

Conclusions

The potential for health risks associated with long-term public exposures to mercury emissions from coincident operations of the existing Matimba and proposed 4800 MW Power Station are predicted to be low even given the potential for multi-pathway exposures. The implementation of very costly mitigation measures exclusively for the reduction of mercury emissions appears unjustified given this finding. It is however noted that the implementation of certain control measures intended to reduce particulate, sulphur dioxide and nitrogen oxide emissions may control mercury emissions to some extent, thus offering additional motivation for the implementation of such measures (inline with the precautionary principle). With regard to the implementation of control measures to reduce mercury emissions the following observations are made, based on the IPPC BREV document (November 2004):

- Fabric filters have a control efficiency of 40% for mercury
- Spray drying scrubbers have a 35% to 85% control efficiency for mercury
- Sodium scrubbing using NaClO as the additive can result in a 95% control efficiency for mercury
- For ESPs and fabric filters, operated in combination with FGD techniques, for example wet limestone scrubbers, spray dry scrubbers or dry sorbent injection, the average mercury removal rate is 75% (50% in ESP and 50% in FGD) and 90% with the additional use of a high dust SRC.

We trust that the information provided adequately address the concerns raised by groundwork and reiterate that these findings should be included in the final EIR.

Yours sincerely,



Yvonne Scorgie
Director

**ENVIRONMENTAL IMPACT ASSESSMENT
EVALUATION**

ESKOM MATIMBA 'B' POWER STATION

LEPHALALE / ELLISRAS

LIMPOPO PROVINCE

April 2008

ACRONYMS

EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
ROD	Record of decision from the Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism

BACKGROUND

An Environmental Impact Assessment is done in support of ESKOM's application for a permit to construct a new power station on the farm Naauwontkome 509 LQ and ancillary services on the farm Eenzaamheid.

This document is to be considered a working document and is the response of the Hills family who is the adjacent landowner on the western side of the proposed development and is based on the official environmental impact assessment presentation made by Bohlwek on behalf of ESKOM. It also serves as a record of concerns, objections and proposals made by the family to mitigate the total impact of the proposed development.

KNOWLEDGE GAPS

At the time of the compilation of this document, the author did not have the opportunity to study the EIA document in detail. During the consultation meeting on 30 April 2006, Bohlwek committed them to furnish affected parties with a DVD of the total study within a couple of days since we need to comment on this document before 28 April 2006. To date (6 April 2006) nothing was received and the family needs to enter into discussions with ESKOM before they finalise their comment on the document.

Assumptions made in this document are therefore based on information received during the recent information-sharing meeting in Midrand on 30 March 2006.

During this meeting Bohlwek made a presentation on the proposed project and ESKOM and the Department of Water Affairs answered questions from the floor.

It must be clearly stated that certain questions and comments were not satisfactorily answered. The quality of the presentation is also a concern since no maps and diagrams of expected impacts and proposed mitigating measures were shown. The speed at which the presentation was made was also very fast.

It could have been sufficient if we had information of the project beforehand. It is just not good enough to say that the information is available on the Internet, or in some

library since not everybody have the skill to access the internet or the time to spend in a library to study the documents beforehand.

Specific aspects which need to be answered from the lack of information are as follow:

- • Was Vergulde Helm part of any baseline studies and if not why not? This farm is adjacent and downwind of the proposed operation.
- Specific baseline information, which is important to be able to determine the impacts during the different stages, on this farm are:
 - Baseline noise measurements during the day, at nighttime, on Saturdays and on Sundays.
 - Fall-out dust counts on this farm.
 - Chemical analysis of the water from the existing borehole as well as a hydro census.
- How could the consultant determine the cumulative impacts of supporting projects e.g. the coal plant and the transmission lines if they only now started with these studies? The landowner requires a satisfactory answer and proof of the cumulative impact assessment or this will become a major objection against the way the EIA was conducted.
- Did the groundwater study include a pollution plume projection model to determine the pollution impact of the ash dam on the groundwater over the lifespan of the ash dam?
- Did the surface water impact assessment considered the management of wastewater and brine from the water treatment plan and sewerage facility?

ASSUMPTIONS AND CONCERNS

A power station, which consists out of initially three units, will be constructed and there is probably very little the adjacent farmers can do about it since it is in national interest. This power station will in all likelihood be expanded with another three units. ESKOM plans to commission the first unit in 2010. To achieve this goal within three years will require an extremely well planned operation, abnormal amounts of construction personnel and a 24 hours working day, 7 days a week operation.

The power station will have a dry heat-exchanging configuration, which releases heat energy more directly and not in a water vapor as with conventional cooling towers. This will have a significant increase in the ambient air temperature downwind of the prevailing wind direction, which is north-east and directly over Vergulde Helm. Apparently this is one reason why the power station is not built on the eastern side of the existing Matimba power station, since it will negatively impact on the operation of that power station. The impact of this on the bio-diversity over extended periods is never scientifically determined and should therefore serve, as a knowledge gap in the impact assessment and ESKOM should consider it a significant risk. The Hills family reserves the right to react to this impact at any time if it proves to become a problem.

Ancillary services and infrastructure will be constructed on the farm Eenzaamheid, which is immediately adjacent to the farm Vergulde Helm 316 LQ. This includes but is not limited to the following:

- An ash dam of many hectares of which the pollution plume and impact on the ground water profile over the life of the ash dam is not known or modeled. This may negatively impact on the water quality of Vergulde Helm. Nor is the effect of dust pollution from the dry areas of the dam during high winds not known or modeled.
- A sewerage processing plant to treat and manage the power stations sewerage, may be placed at a location which is upwind of the farm and will have a negative impact on the air quality.
- Water treatment facilities, storage dams and waste water management facilities. The management of brine from the demineralization plant could not be explained during the consultation session and it is therefore assumed it is also managed and disposed of at this farm. The impact of this is therefore unknown.
- The cooling towers and other infrastructures may also be constructed on this farm will impact directly on the topography and visual aspects from Vergulde Helm.
- Uncertainty exists on the impact of power lines and its cumulative impact of the project on adjacent farmers. The assumption is made that this was not addressed in the EIA. It is expected that the distribution yard, which have massive security lights will be placed on the southern end of the power station and this will have a serious impact on light pollution, of which the effect is poorly studied in the Bushveld savannah biosphere.
- ESKOM will not provide accommodation for any staff, during construction or during the normal operation of the power station. Uncertainty exists on how contractors will manage this problem and if vast amounts of squatters will be established all over the larger area. Rumor has it that Eenzaamheid will be used as construction workers camp.
- No Strategic Environmental Assessment is done for the corridor between Lephalale and Steenbokpan

IMPACT ASSESSMENT ON VERGULDE HELM AS SEEN FROM THE PERSPECTIVE OF THE HILLS FAMILY:

Aspect	Significant Impact	Potential Impact	Negligible Impact	Aspect and Impacts need addressing
Geology			X	
Topography	X			X
Soil		X		
Vegetation	X			
Animal life	X			X
Surface water		X		
Ground water	X			X
Land use	X			
Land capability (Revenue potential)	X			X
Noise	X			X
Light	X			X
Air quality	X			X
Socio Economics (Revenue generated)	X			X
Security	X			X
Visual	X			X

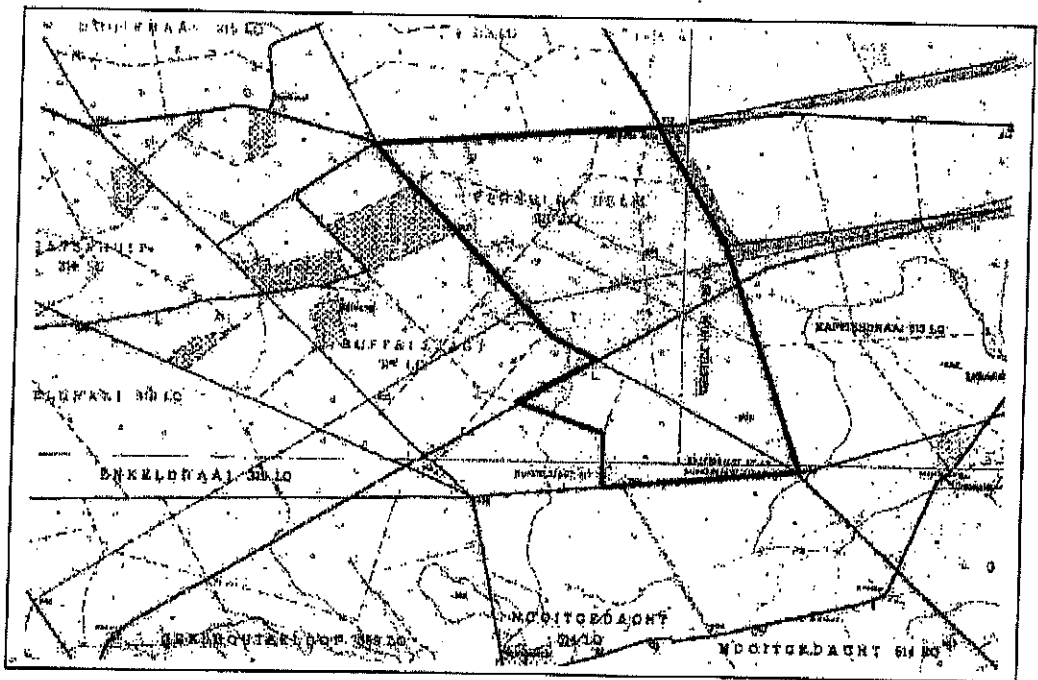
As can be seen the proposed power station will have definite and specific impacts on the farm and landowner.

SPECIFIC CONCERNS OF THE HILLS FAMILY

It is important to note that the Hills family is the landowner of the farms Vergulde Helm (1300 ha), part of Buffelsjagt (900 ha) and part of Geelhoutskloof (1300 ha), immediately adjacent on the western side of Eenzaamheid.

There is no question that the development will have a negative impact on the farmer in different ways and additional to the concerns listed above under Assumptions and Concerns, the Hills family has the following specific concerns.

- Large buildings and the ash dam will have a negative impact on the aesthetic value to the family. The Matimba power station is currently only slightly visible from certain places on the farm and this development will bring the impact on their doorstep.
- The development will have a definite impact on the income of the farm. Currently, the farmer earns his living from the ranch and hunting activities. It is doubtful that hunters will in future use this farm due to the continuous construction activities, sirens and reverse hooters at night from construction machines, and all the other construction activities. This noise will be present 24 hours per day seven days per week for at least the next ten years and will have a devastating impact on the hospitality industry on this farm. It is also known that high pressure steam blow down to clean the piping system and during unit failures which are frequent during the commissioning stage, generates unacceptable noise levels.



Map1: 1: 50 000 Topographical maps of the location of the Hills family land (Indicated in red)

- The potential of the breach of security especially on the boundary between Vergulde Helm and Eenzaamheid is an area of great concern. It is well known that poaching is a major problem. Secondary problems include snares and traps, illegal entry, squatting, theft and general safety of the landowner due to the influx of contractors and often unsavory characters.

- The negative impact of dust pollution during the construction phase due to the vast areas denuded of vegetation. This will be followed by poor air quality (SO²) for the rest of the life of the power station.

OPTIONS AND PROPOSALS

It is important to note that the Hills family as responsible people see the need for the development and therefore seek solutions to the problems in order to achieve a win-win situation.

As part of this effort, The Hills family wishes to propose the following to ESKOM:

a. **Selling the land**

The first option is the ESKOM buys out the land to serve as buffer zone between the development and other farms. Due to vast investments, intangible and intrinsic value and the future loss of income, the family cannot consider any offer less than R 5 000 per hectare.

The next option is that ESKOM assist the family in order to develop a specific area on the boundary with Eenzaamheid to recover the loss and income due to the industrial development and thereby ensure the continuation of their livelihood.

Since the family plans, as remedy, to develop a part of the farm as up-market accommodation and conference facility for senior staff of the contractors and ESKOM during the construction phase, they would at least require the following:

b. **Impact: Reduction in ground water quality:**

A potable water supply at the boundary between Eenzaamheid and Vergulde Helm at a position, which will be mutually determined. They require at least 5000 liter of potable water per day to sustain the development.

c. **Impact: Security:**

The landowner requires from ESKOM to fence the boundary with a 3 meter diamond wire fence with a special blade wire section on top prevent people from climbing over the fence and to prevent animals to move onto the construction site.

d. Impact: Visual, noise and light pollution:

ESKOM will need to remove all topsoil from the footprint of the ash dam. The family request ESKOM to ensure this soil is used and stored as a 5- meter high berm wall between Eenzaamheid and Vergulde Helm to ensure the noise is deflected upwards and glare from security lights are screened away. This berm must be planted with appropriate grass species and indigenous trees. This topsoil can be used during the rehabilitation process during closure.

e. Loss of land capability and income:

Since the family plans to develop between 30 and 50 high quality chalets they require the following from ESKOM:

- The water supply as described in b.
- A sewerage connection point on the Vergulde Helm boundary that links Vergulde Helm with the power station sewerage facility.
- A 315-kVA power supply on the same boundary.
- A commitment from ESKOM to promote and use the conference facilities, which is planned as part of this facility.

f. Animals and Vegetation:

The landowner requires from ESKOM to clear and maintain a 6-meter wide area next to the boundary fence to prevent veldfires from jumping into Vergulde Helm.

Continuous environmental engineering to ensure excessive noise during plant failures are contained and mitigated, acid rain and toxic gas emissions are mitigated.

The required fence as described under d to keep game from moving onto the construction site.

g. Compliance:

Since the adherence to the Environmental Management Programme is extremely important and due to the extreme pressure on the environment due to shortcuts taken during construction, which is often happen with projects with tight timeframes, the adjacent landowners (Affected parties) are concerned about non-compliance.

As mitigating measure they request ESKOM to appoint an external auditor to conduct quarterly EMP compliance audits during the construction phase of the power station. They wish to have an input in the appointment of this auditor to ensure impartiality. The cost of the auditor should not exceed R 20 000 per audit.

Closure

As can be seen the Hills family is willing to work with ESKOM to make this important project a success. They will however remain an important affected party and needs to protect their own interest as far as possible. Between them and ESKOM, which is known to be a reasonable and responsible corporate citizen a win-win solution can be found and the family declare themselves available to seek this solution. Once an agreement is reached, the final report will be compiled and submitted to ESKOM and the DEAT as leading agent.



GROENEWALD VANDYK INC
ATTORNEYS, NOTARIES & CONVEYANCERS

U verw:
Your ref: INGRID SNYMAN / ASHLEA STRONG

Ons verw:
Our ref: DVD/jh/DD0058

Datum:
Date: 2006

Per Faks:
Per Fax: 011 – 466 3849

Aan:
To: **BOHLWEKI ENVIRONMENTAL (PTY) LTD**
P O BOX 11784
VORNA VALLEY
MIDRAND
1686

URGENT

Madam,

RE: OUR CLIENT : MW DE JAGER KINDER TRUST / LANDELANI GAME LODGE / MW DE JAGER SAFARIES / ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED NEW ESKOM COAL-FIRED POWER STATION PROJECT (MATIMBA B) IN THE LEPHALALE AREA, LIMPOPO PROVINCE

1.

We refer to the above mention matter and the draft environmental impact report received 10 April 2006.

2.

We have started to study this elaborate report which in our opinion falls short of many aspects and issues that concerns the affected and interested parties but more specific our clients. However, we need extended time to comprehensively comment on this report. We need expert opinions and have to appoint consultants to prepare

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DIRECTORS: CHARL GROENEWALD • DEON VAN DYK • ESMARI JONKER
NOTARY & CONVEYANCER: WILLEM THEUNISSEN

our client's comments and concerns on the draft report. We further request that this letter be disclosed to the relevant authority, namely, LDACE in order to reserve our client's rights.

3.

We therefore request an extension of **60 days** to prepare proper comments on your draft report.

4.

We can at this time mention that there are several critical issues not addressed in the report which needs further investigation and comments as mentioned. These include but are not limited to the issues of impact on our clients businesses, i.e. breeding of endangered species and health related matters to these endangered fauna. The influence the proposed plant will have on endangered flora species direct adjacent to the proposed area. The effect the proposed development will have on ecotourism and hunting safari businesses, which have direct impact on our clients. These and many more aspects are not addressed in your report. These issues will be addressed in our elaborate comments to follow.

5.


Kindly as a matter of urgency reply with your approval of the extension of time to properly comment. We hold instruction that should our request for extension of time not be granted that we approach the High Court and obtain the necessary relief by way of interdict for an extension to comment. The period granted is insufficient for proper comment as this report is an elaborate document which needs scrutiny and consultation in order to make fair and reasonable comments on behalf our clients.

We wish to draw your attention to the recent case between **"WE CARE"** and **"BOMBELA CONSORTUIM"** (GAUTRAIN PROJECT) in the High Court with regard to extension of time in order to properly comment on these reports by affected and interested parties.

6.

We urgently await your reply. Kindly forward us the information of the relevant person at LDACE who deals with this application in order to forward a copy this letter to the said relevant person and or persons.

Yours faithfully,


DEON VAN DYK
GROENEWALD VAN DYK INC.

3

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5 May 2006

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Attention: Mr D van Dyk

RE: EIA FOR A NEW PROPOSED COAL-FIRED POWER STATION (MATIMBA B) IN THE LEPHALALE AREA, LIMPOPO PROVINCE

Dear Mr van Dyk

We hereby acknowledge receipt of your letter as received on 24 April 2006.

We have considered the content of your letter and in light of the specialist studies undertaken and the issues raised by your clients during the process. We believe that the issues have been covered within the report.

In addition, we have considered your request for an extension of time to comment on the report. We believe the public participation process followed and the time periods allowed were reasonable and fair. After discussions with the National Department of Environmental Affairs and Tourism (the decision-makers on the project) and Eskom (who emphasised that this project is critical to ensure sufficient electricity supply in the future), we have agreed that a 3 week extension from the closing date of the comment period is reasonable. Therefore, your comments would be due on 19 May 2006.

In addition to the above timeframe extension, we would like to invite you to meet with us and our specialists prior to the extended closing date in order to practically evaluate and clarify your issues and concerns. Please notify us as to what dates would be suitable for yourself and your clients.

Please also note that the Limpopo Department of Economic Development, Environment and Tourism (LDEDET) is the commenting authority for this application. The decision-making authority is the National Department of Environmental Affairs and Tourism (DEAT). The contact details of both authorities are as follows:


- *DEAT* - Environmental Officer - Mr Danie Smit
Tel: 012 310 3659
Fax: 012 310 3688

Email: dsmit@deat.gov.za

- *LDEDET* - Environmental Officer – Mr Tsunduka Hatlane
Tel: 015 295 9300
Fax: 015 295 5819
Email: hatlanetn@ledet.gov.za

Please do not hesitate to contact us with any further queries in this regard.

Kind Regards



Ashlea Strong
Environmental Scientist

CC: Mrs Deidre Herbst (Eskom)
Mr Danie Smit (DEAT)



GROENEWALD VAN DYK INC
ATTORNEYS, NOTARIES & CONVEYANCERS

U verw:
Your ref: INGRID SNYMAN / ASHLEA STRONG

Ons verw:
Our ref: DVD/jh/DD0058

Datum:
Date: 8 may 2006

Per Faks:
Per Fax : 011 – 466 3849

Aan:
To: **BOHLWEKI ENVIRONMENTAL (PTY) LTD**
P O BOX 11784
VORNA VALLEY
MIDRAND
1686

AND TO MR DANIE SMIT
DEAT
012 310 3688

AND TO MR TSUNDUKA HATLANE
LDEDET
015 295 5819

Madam,

RE: OUR CLIENT : MW DE JAGER KINDER TRUST / LANDELANI GAME LODGE / MW DE JAGER SAFARIES / ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED NEW ESKOM COAL-FIRED POWER STATION PROJECT (MATIMBA B) IN THE LEPHALALE AREA, LIMPOPO PROVINCE

1.

We refer to the above- mentioned matter and your letter under reply dated 5 MAY 2006.

2.

We have indicated to you that we need sixty (60) days in order to obtain the services of experts with regard to the effects of the coal-fired power station on the breeding of rare and endangered species, more specific that of the Tuberculos free buffaloes breeding and the highly sensitive breeding of the endangered Roan antelope. We have requested the services of an expert in the field of respiratory diseases and the influences the proposed coal fire station will have on these species. We shall further request the University of Pretoria Veterinary School to advise and recommend an expert in these fields to assist us in obtaining objective opinions and reports on the effects the power station will have as indicted above. In the meantime we requested the services of both Dr Raath and Dr Stalzman, both whom are highly regarded, obviously by virtue of their respected statue they are in high demand. We await a date to consult with these respected experts as well as a quote for the work to be done.

3.

We await confirmation for an extension of sixty (60) days before or on closing of business 10 MAY 2006, from your offices. We have instruction to obtain the necessary relief should you refuse to extend the time frame for comments. As indicted we need to obtain the services of experts to investigate and to compile a report on the issues mentioned as well as the issues of impact on the livelihood of our clients businesses which are crucial for their existence. They need a fair and reasonable time to obtain the services of experts to investigate and advise them accordingly. We cannot comment properly without the input of these experts. The draft report is a unilateral report which does not take in account the negative effects this proposed plant have on the livelihood of our clients. This report is a generalised overview of impact and does not deal with specific aspects concerning the businesses of our clients. The timeframe to compile an informed and comprehensive answer and comments is insufficient. You have had over six months to prepare this report and now unreasonably require our clients to study and answers to this report in time limits insufficient to obtain the necessary experts and to have them compile the necessary reports.

4.

We now deal with the contents of your letter dated 5 MAY 2006, seriatim as follows;

4.1 Ad paragraph 1 thereof.

The content is noted.

4.2 Ad paragraph 2 thereof.

The contents is denied

4.3 Ad paragraph 3 thereof.

The content is denied. We feel that the time to comment on this report is insufficient neither fair nor reasonable. We hold instruction to approach the High court for the necessary relief should you refuse the extension of time as requested.

4.4 Ad paragraph 4 thereof.

The content is noted and we shall obtain instruction from our client with dates suitable to all parties. We shall also list our particular points of issues and concerns as well as the concerns our experts have in order to make the meeting as productive and efficient as possible.

4.5 Ad paragraph 5 thereof.

The content is noted and we thank you for the information. A copy of this letter shall be forwarded to the concerned authorities for their notice and attention.

5.

Our clients have also raised the issue of the implication of cost to properly comment and answer to this report. Suffice to say that the cost implication to obtain these expert opinions will come at great expense and our clients reserve the right as to these cost and or damages incurred due to the neglect to deal with these specific issues in your report. Any damages our clients incur due to oversight to deal with these specific issues in the unilateral report and the consequences resulting due to the neglect to deal with these issues are strictly reserved.

6.

We urgently await your confirmation for the requested extension in time as indicated above.

Yours faithfully,


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10 May 2006

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Attention: Mr D van Dyk

**RE: EIA FOR A NEW PROPOSED COAL-FIRED POWER STATION IN THE LEPHALALE AREA,
LIMPOPO PROVINCE**

Dear Mr van Dyk

We hereby acknowledge receipt of your letter as received on 8 May 2006.

We would like to assure you that we have noted your clients' issues with regards to the impacts on their breeding programs and their eco-tourism business. In your letter (dated 8 May 2006, 3rd paragraph) you state that the report is a generalized overview of the impacts. We would like to confirm that, in general, the nature of an Environmental Impact Assessment (EIA) process is to be sufficiently broad to assess the impacts as they pertain to all comments and issues raised during the process. EIA specialist studies cover all environmental and social aspects to an appropriate level of detail for decision-making and not to the level of detail required for research. However, where research information is available it is used to ascertain the significance of environmental impacts.

The issues raised by your clients in November 2005 and in more recent communication have been evaluated in the Environmental Impact Assessment and are documented in the Draft Environmental Impact Report. Bohlweki have again engaged the relevant specialists in this regard and have requested them to extract the relevant portion of the EIA report, and the attached appendices, in order to compile a document that draws specific information to your concerns and issues to reduce the time it would take for you to comprehensively comment on the draft EIR. This report does require some time to pull together and should be available for your clients by the 12th of May 2006. This report and your correspondence to date will be included as part of the final EIA report that is to be submitted to DEAT. We are of the opinion that our specialists have investigated the concerns raised by your clients and this will be reflected via the Final EIA report, and that no costs to ourselves or Eskom in lieu of your clients seeking their own expert opinions are warranted.

We would like to reiterate that Eskom still views the three (3) week extension period, as per our letter dated 05 May 2006, as reasonable, and still requires your comments by 19 May 2006. We have informed DEAT of our exchange of correspondence accordingly. The public participation for this project was initiated approximately one year ago and many opportunities have been provided to your clients during this period to comment and raise specific areas of concern. As stated above the issues that were raised have been covered. Your clients have requested an extension in order to obtain expert opinion on the impacts of a coal-fired power station on rare and endangered species. It appears that your clients wish to refute the studies undertaken by our specialists. We believe that our specialists are credible and that any additional studies initiated by your clients will be for their account. A total of 56 days has already been afforded to your client to comment on the Draft Environmental Impact Report. An extension of 60 days (end 28 June 2006) will impact negatively on the future provision of electricity.

We would still like to engage with you on these matters and note your willingness to obtain dates from your clients. We believe that a meeting would be the most productive and efficient method to deal with many of the issues highlighted. As requested in our previous letter, this meeting needs to take place prior to 19 May 2006 so that your comments and issues can be incorporated into the final EIR.

We note that you are threatening to approach the High Court for relief. The applicant has indicated that they will oppose your application.

Please do not hesitate to contact us with any further queries in this regard.

Kind Regards

A handwritten signature in black ink, appearing to read 'Ashlea Strong', with a long horizontal line extending to the right.

Ashlea Strong
Environmental Scientist

CC: Mrs Deidre Herbst (Eskom)
Mr Danie Smit (DEAT)



GROENEWALD VAN DYK INC
ATTORNEYS, NOTARIES & CONVEYANCERS

U verw:
Your ref: INGRID SNYMAN / ASHLEA STRONG

Ons verw:
Our ref: DVD/fh/DD0058

Datum:
Date: 12 MAY 2006

Per Faks:
Per Fax : 011 - 466 3849

Aan:
To: BOHLWEKI ENVIRONMENTAL (PTY) LTD
P O BOX 11784
VORNA VALLEY
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AND TO MR DANIE SMIT
DEAT
012 310 3688

AND TO MR TSUNDUKA HATLANE
LDEDET
015 295 5819

Madam,

RE: OUR CLIENT : MW DE JAGER KINDER TRUST / LANDELANI GAME
LODGE / MW DE JAGER SAFARIES / ENVIRONMENTAL IMPACT
ASSESSMENT FOR THE PROPOSED NEW ESKOM COAL-FIRED
POWER STATION PROJECT (MATIMBA B) IN THE LEPHALALE AREA,
LIMPOPO PROVINCE

1.

We refer to the above- mentioned matter and your letter under reply to our letter of 8
MAY 2006.

2.

We now deal with the contents of your letter dated 10 MAY 2006, seriatim as follows;

4.1 Ad paragraph 1 thereof.

The content is noted.

4.2 Ad paragraph 2 thereof.

We take note that you take note of our client's issues with regard to the breeding programs of the endangered species and that of our clients businesses. The issue remains the vagueness of your report in relevance to these issues and the consequences it has on our client's rights. Your confirmation that in general, the nature of an environmental impact assessment process is to be sufficiently broad is noted. However, you refuse to grant our client the opportunity to deal with aspects not dealt with in this already generalised and broad report. You allege that EIA studies cover all environmental and social aspects to an appropriate level of detail for decision-making and not to the level of detail required for research. Unless we have been handed a document flawed or lacking formation, we find no reference to the impact of the proposed plant on our client's businesses and more particular the breeding of endangered species as indicated in our previous correspondence. Kindly refer us to the impact of these relevant issues and more specifically the breeding program of our client's as well as the health implication this proposed plant will have on these operations. None of your experts or specialists dealt with or consulted with our clients in this regard. Our clients are not aware of any visits to these herds or its habitat nor do we find the specific reference made to these endangered and clean herds of our clients. These matters have direct influence on the business of our clients, a matter you conveniently overlook or deem not important enough to be dealt with in your EIA report. Kindly refrain from referring to part of the document where the impact of our clients is addressed when we have no such reference in the document handed to us. We are specifically referring to the impact on that of our clients who are affected by the proposed plant and not the specific proposed sites of the proposed plant.

4.3 Ad paragraph 3 thereof.

As indicated above you again allege that the issues we raised have been evaluated and documented in the draft report. Again, unless we have a flawed document, we cannot locate the specific reference of the impact the plant will have on respiratory diseases especially that of the TB free buffalo herds of our clients. Neither do the report make any reference to the specific impact of the proposed plant will have on any of the aspects addressed in a previous correspondence as well as issues raised at the Matimba meeting. Kindly indicate where the report addressed the negative impact the proposed plant will have on International Safari hunting business of our clients and how the proposed plant will negatively impact these businesses as well as the safety of the domestic and international clients and visitors of our clients. We are in great anticipation to the extracts and appendices by the relevant specialists referred to in this paragraph. Kindly notify us of these extracts on the 12th of May 2006. We take note that our correspondence will be included in the final report. However this is not sufficient and as we indicated before, we need to comprehensively answer and raise our clients concerns with evidence and expert opinions in order for any authority to make an appropriate and informed decision. We emphatically deny that your appointed specialist investigated all the concerns our client as the report does not reflect all of our clients concerns.

4.4 Ad paragraph 4 thereof.

Suffice to say that we shall not deal with this any further as we have requested an extension of 60 days to compile a comprehensive and informed report and we cannot do this before the 19th of May 2006. Your refusal is noted and we shall obtain the necessary relief. Take note that we shall also seek cost in this regard. Your allegation that the public participation for the project was initiated one year ago is denied. The report is the issue of discussion and it is this report that forms part of the decision-making process. It is this report that should be attacked where it lacks information for an authority to make an informed decision. It is this report that gives our clients the opportunity to raise issues with the relevant authorities regarding their rights. Your assumption that our clients wish to refute the studies of your specialist are to say the least absurd. Your specialists (unless again we do not have the same report) omit, alternatively lack to deal with certain issues raised by ourselves. It is the purpose of this report that concerned parties can comment in order for the necessary authority to make the correct decisions, an aspect you deem not necessary alternatively conveniently like to ignore. Your allegations as to the negative impact of

future provision of electricity is noted however there is a due process in place and our client has the right to exhaust all remedies in order to protect their rights in this regard. The EIA process is one of many applications you need to comply with. We only *obiter* mention that we certainly look forward to obtain all further applications of your client, i.e. the rezoning of agricultural land, township establishment and or any other applications that has impact on our client's rights.

4.5 Ad paragraph 5 thereof.

19 May 2006 is only a week away. We are not sure of your schedule but the writer is already committed to High Court litigation. We are also advised by our client that he is committed with international guests. Suffice to say that it will be not be possible to meet before 19 MAY 2006. We shall however try our utmost best to schedule a meeting for the 22 MAY 2006, if convenient to you and your specialists. The extension of time is clearly needed and we have debated this matter with you extensively, with no success. We are of the opinion that you are unreasonably denying our client the right to fairly comment on a report that has far reaching implications of their rights and livelihood. Your stubborn refusal infringes the rights of our client and the *audi alteram partem* rule in this administrative process. The said specialists and experts needed to properly comment and can only facilitate our clients on the earliest 30 MAY 2006. They then still need to visit our clients various farms, investigate and write the necessary report for comments to your EIA report. Suffice to say that of all institutions you should know best how tedious task and time involved obtaining the opinions of experts in this regard.

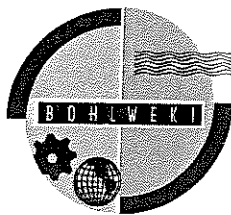
4.6 Ad paragraph 6 thereof.

The content is noted and our application shall follow soon to be duly served on your and your clients offices. In the interim we shall to the best endeavour to meet with you and the specialists.

Yours faithfully,

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12 May 2006

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Attention: Mr D van Dyk

**RE: EIA FOR A NEW PROPOSED COAL-FIRED POWER STATION IN THE LEPHALALE AREA,
LIMPOPO PROVINCE: ISSUES SUMMARY AND SPECIALIST RESPONSE**

Dear Mr van Dyk

The issues raised in your letter received 24 April 2006 and our letter of response dated 10 May 2006 have reference.

Bohlweki Environmental have further engaged the relevant specialists in the EIA team and requested them to extract the relevant portions of the EIA report in order to provide more specific responses to your concerns and issues. We trust that this brief summary will be informative and provide a basis for discussion.

The following issues have been covered in this summary:

- Fauna and Flora
 - * The breeding of endangered species and health related matters to these endangered fauna; and
 - * The influence the proposed plant will have on endangered flora species in proximity to the development area.
- Air Quality Issues
- Tourism

1. FAUNA AND FLORA

It was indicated that Buffalo and Roan are included in a breeding programme on your clients' farms. The following persons were contacted in order to obtain professional opinions relating to the potential impacts of the power station on the above-mentioned animals:

- Dr Pierre Bester
- Burnett Woodley

1.1. The Breeding of Endangered Species and Health Related Matters to these Endangered Fauna

- The likelihood that the proposed development will have an impact on the health of endangered fauna is considered extremely unlikely.
- The most likely manner for these animals to be impacted on in terms of health would be through food and water, or the systematic introduction of cattle and or buffalo (not disease free) or roan to the area. Refer to the air quality impact chapter within the EIA Report and the air quality response within this letter for more information with regards to pollutants and their impact on vegetation.
- Issues such as noise and proximity are not expected to have any impact on the health of these species as these animals either move away from the source of disturbance or become used to the disturbance. Particularly buffalo are known to be tolerant, adapting rapidly to such forms of disturbances.
- It was indicated that air quality as well as water quality can play a significant role in the health of these animals. Since pollution water is not a product that will be released from the proposed power station, no direct effect is expected that could impact on these animals. The likelihood that groundwater will be affected in a manner that would impact on these animals is also considered extremely unlikely. For a more comprehensive discussion of impacts of the proposed power station on groundwater, the reader is referred to the geohydrological and air quality chapters within the EIA Report.
- Successful breeding of Roan, Sable and Rhino on the farm Naauwontkome, which is located close to the existing Matimba Powerstation, can be used as an example that any potential impact on animals are extremely unlikely.

1.2. The Influence of the Proposed Plant on Endangered Flora Species Directly Adjacent to the Proposed Area

- The likelihood of Red Data flora species occurring within the relevant farms was assessed during the scoping investigation (June 2005) and was based on existing habitat status and habitat variation. This likelihood was estimated to range from low to high (where extreme habitat variation was encountered on Nelsonskop).
- The EIA surveys were conducted on the farms that were identified during the scoping phase to exhibit the lowest sensitivity in terms of ecological attributes, including red data probabilities. Data records from SANBI indicate a possible 4 Red Data flora species as being present within the relevant ¼ degree grid. None of these species were observed during the site investigations and the likelihood of these species occurring on these areas are considered to be medium to low as the available habitat on the proposed areas are not considered particularly suitable for these species.
- Vegetation and habitat in the immediate surrounds to the proposed development area are considered similar in terms of status, and therefore also Red Data flora potential.
- The only significant threat to Red Data flora species is habitat destruction as a result of surface disturbances.
- A visual inspection of the existing Matimba Power station revealed that the development is fenced off by means of a relative high and impenetrable fence, implying that extremely limited peripheral and indirect impacts and activities would occur outside the perimeter. Assuming that similar measures will be implemented at the proposed power station, the likelihood that Red

Data flora species might be impacted by the proposed development is considered extremely low.

2. AIR QUALITY ISSUES

Concerns are raised regarding the impact of the proposed power station on the breeding of endangered fauna species and on endangered flora species situated directly adjacent to the proposed development area. The air quality specialist's response to these concerns is restricted to the potential for exposures and resultant impacts related to atmospheric emissions from the existing and proposed power stations. The farms on which the fauna and flora are situated include Vlakvallei and Nooitgedacht.

The air quality impact study found that sulphur dioxide emissions had the greatest potential for damage to health, ecosystems and property compared to the extent of emissions of other pollutants such as particulates, heavy metals and nitrogen oxides. This pollutant therefore formed the focus of the impact study, although the potential for impacts due to other pollutants were also evaluated.

The predicted maximum sulphur dioxide concentrations occurring due to current power station emissions and cumulative concentrations due to current and proposed power station emissions (assuming installation of 4800 MW power station) at the Nooitgedacht farm⁽¹⁾ were as follows:

Emission Scenarios Predicted sulphur dioxide concentrations given:	Highest Hourly (99th Percentile) ($\mu\text{g}/\text{m}^3$)	Highest Daily ($\mu\text{g}/\text{m}^3$)	Annual Average ($\mu\text{g}/\text{m}^3$)
Current Power Station Operations	274	42	7.1
Current and Proposed 2400 MW PF Power Station Operations (uncontrolled)	663	92	14.5
Current and Proposed 2400 MW PF Power Station Operations (90% control efficiency)	415	48	7.8
Current and Proposed 4800 MW PF Power Station Operations (uncontrolled)	1630	136	22.1
Current and Proposed 4800 MW PF Power Station Operations (90% control efficiency)	435	54	8.6

Based on the dose-response thresholds, the exposure of vegetation and ecosystems to ambient sulphur dioxide concentrations and the ambient air quality limits issued by the EC and WHO for protection of ecosystems (see Appendix A), the potential for vegetation injury was characterised in the air quality impact study as follows:

¹ Higher concentrations predicted at Nooitgedacht compared to Vlakvallei.

Category of Risk for Vegetation Injury(a)	Maximum Hourly Average SO ₂ Concentration (µg/m ³) (99 th percentile)		Maximum Annual Average SO ₂ Concentration (µg/m ³)	Basis
Low	< 1 300 µg/m ³	AND	< 20 µg/m ³	EC annual SO ₂ limit given as 20 µg/m ³ for the protection of ecosystems WHO guideline for annual SO ₂ given as in range of 10 – 30 µg/m ³ depending on sensitivity of receiving environment Hourly average of 1300 µg/m ³ given as being associated with visible effects on the leaves of sensitive plant species (~5% of leaf area affected)
Moderate	> 1 300 µg/m ³	OR	20 – 30 µg/m ³	
High	> 1 300 µg/m ³	AND	> 30 µg/m ³	

(a) Assumption of availability of vegetation at all sites – comprises a conservative assumption in certain instances, e.g. where mining activity prevails.

The characterization of the potential for air quality impact during the study was based on the premise that the vegetation in the study region was not overly sensitive (i.e. as sensitive as lichen within humid areas). The potential for impacts on vegetation was classified as “low” given current power station emissions and well controlled future power station emissions, and as “moderate” for cumulative concentrations given uncontrolled emissions from a proposed 4800 MW power station.

GVD Attorneys refer to endangered flora species. We are uncertain at this stage as to the exact nature of the species and are therefore not able to address directly the sensitivity of these species to sulphur dioxide exposures. Should the very conservative assumption be made that these species are as sensitive as lichen in a humid environment, it may be surmised, based on the WHO guideline for lichen (10 µg/m³ for annual average), that the potential exists for exceedances of this guideline given *uncontrolled* emissions from the proposed power station. Given the implementation of 90% control efficiencies, cumulative sulphur dioxide concentrations due to both the proposed 2400 MW and 4800 MW power stations alternatives would be within the WHO guideline.

3. TOURISM

The issue raised with regards to tourism was “the effect the proposed development will have on ecotourism and hunting safari businesses, which have a direct impact on our Clients.” It is stated that this aspect is not addressed in the EIA report.

The tourism specialists firstly wish to point out, that by the objectors own admission, they have not had time to adequately review the said report. This could explain why they feel that the above issue has not been addressed in the report. Our specialists wish to draw attention to the sections of our report which they feel adequately address the concerns raised in the above letter.

3.1. Findings of the Tourism Scoping Study:

- The preferred site for the location of the power station from a tourism point of view was **Nelsonskop**, followed by Appelvlakte, Naauontkomen, and finally Eenzaamheid.
- The preferred site for the location of the ancillary services from a tourism point of view was **Zongenzein**, followed by Nelsonskop, Naauontkmen and Appelvlakte (equal ratings), Kuiperbult, Eenzaamheid, Droogheuvel (equal ratings), and finally Kromdraai.

The tourism specialist's findings indicated that developments on the less preferred sites would potentially have a higher negative impact on the tourism industry. As is the case with many environmental site selection processes, however, the preferred sites of various specialist consultants are entered into a matrix to determine the overall preferred sites – which were Naauontkomen and Eenzaamheid. These farms were thus the ones used for analysis during the EIA Phase.

3.2. Findings of the Tourism Impact Assessment:


The tourism impact assessment noted that potentially significant negative impacts could occur on the ecotourism and hunting activities which may currently take place on the farms located immediately adjacent to the proposed development site. Significant positive impacts, however, would occur to the business sector of the tourism industry. The tourism economy in Lephalale is dominated by business tourism rather than ecotourism (although the ecotourism sector is growing). The overall impact of the proposed development would draw more business tourism into the area, with spinoffs for the ecotourism and hunting sectors. Thus while immediate, short term negative impacts are seen for the immediate farms adjacent to the preferred site, these are considered small when compared to the broader tourism industry in the Lephalale which we believe will benefit significantly from the proposed development.

We trust that you have found the above amplification informative and useful, confirming that we did include and investigate your issues in the draft EIA report. A range of mitigation measures for the construction and operation of the power station have also been included in the EIA report.

We would be glad to engage with you on these matters in person and have noted your willingness to obtain dates from your Clients. We believe that a meeting of this nature, together with our specialists and your specialists, would be the most productive and efficient method to deal with many of the issues highlighted. As requested in our previous letters, we would like to request that this meeting take place prior to 19 May 2006 in the interest of progress and so that your comments and issues can be incorporated into the final EIR.

Please do not hesitate to contact us with any further queries in this regard.

Kind Regards



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Environmental Scientist

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APPENDIX A

Sulphur Dioxide

Sulphur dioxide directly affects vegetation by uptake through parts of the plants that are above the ground. Depending on the amount of sulphur dioxide taken up per unit of time, various types of biochemical and physiological effects take place in the plant tissue, including degradation of chlorophyll, reduced photosynthesis, raised respiration rates, and changes in protein metabolism.

High concentrations of SO₂ over short periods may result in acute visible injury symptoms. Such symptoms are usually observed on broad-leaved plants as relatively large bleached areas between the larger veins that remain green. On grasses acute injury, usually caused by exposures to sub-lethal long-term intermittent episodes of relatively low concentrations, may be observed as general chlorosis of the leaves (Lacasse and Treshow, 1976). This visible injury may decrease the market value of certain crops and lower the productivity of the plants. Sulphur dioxide impairs stomatal functioning resulting in a decline in photosynthetic rates, which in turn causes a decrease in plant growth. Reduction in plant yields can occur, even in the absence of visible foliar symptoms (Mudd, 1975). Relationships between plant injury and SO₂ dosages are given in Table 1.

Table 1. Injury to plants due to various doses of sulphur dioxide⁽¹⁾

Symptoms	Concentrations (µg/m ³)	Concentrations (ppm)	Duration of Exposure
visible foliar injury to vegetation in arid regions	26180	10	2 hr
Coverage of 5% of leaf area of sensitive species with visible necrosis ⁽²⁾	1300 - 2750	0.5 - 1.05	1 hr
visible injury to sensitive vegetation in humid regions	2 620	1	5 min
Coverage of 5% of leaf area of sensitive species with visible necrosis ⁽²⁾	785 -1570	0.3 - 0.6	3 hr
visible injury to sensitive vegetation in humid regions	1300	0.5	1 hr
visible injury to sensitive vegetation in humid regions	525	0.2	3 hr
Visible injury to sensitive species	130 - 1300	0.05 - 0.5	8 hrs
Decreased growth in sensitive species	26 -1300	0.01 - 0.5	-
Bleached spots, chlorosis (middle-aged leaves most sensitive)	785	0.3	8 hrs sustained exposure
Coverage of 5% of leaf area of sensitive species with visible necrosis ⁽²⁾	525 - 680	0.2 - 0.26	6 - 8 hrs
Yield reductions may occur	525	0.2	monthly mean
Growth of conifers and yield of fruit trees may be reduced	260	0.1	monthly mean
Yield reductions may occur	210	0.08	annual mean
Growth of conifers and yield of fruit trees may be reduced	130	0.05	annual mean
Critical level for agricultural crops, forest trees and natural vegetation ⁽³⁾	79	0.03	24-hrs
Critical level for agricultural crops ⁽³⁾	26	0.01	annual mean
Critical level for forest trees and natural vegetation ⁽³⁾	21	0.008	annual mean

Notes:

⁽¹⁾References: Laccasse and Treshow, 1976; Mudd, 1975; Manning and Feder, 1976; Harrison, 1990; Godish, 1991; Ferris, 1978; Boubel *et al.*, 1994.

⁽²⁾Resistant species found to have threshold levels at three times these concentrations.

⁽³⁾Refer to critical levels used by the United National Economic Commission for Europe to map exceedence areas. These represent levels at which negative responses have been noted for sensitive receptors.

Lower plants such as lichens and mosses have a particular sensitivity to sulphur dioxide due to their structure. Commercial species that are sensitive to SO₂ include spinach, cucumber and oats. These species may show decreases in growth at concentrations of 0.01 to 0.5 ppm (Mudd, 1975). Visible SO₂ injury can occur at dosages ranging from 0.05 to 0.5 ppm for 8 hours or more (Manning and Feder, 1976). Maize, celery and citrus show much less damage at these low concentrations (Mudd, 1975).

Air quality criteria issued by the EC, UK and WHO for the protection of ecosystems against sulphur dioxide exposures are summarised in Table 2.

Table 2. Thresholds specified by certain countries and organisations for vegetation and ecosystems

Pollutant	Averaging Period	Threshold (ppb/ppm)	Threshold (µg/m ³ or mg/m ³)
Sulphur dioxide	annual average	3.7 - 11.1 ppb(a) 7.4 ppb(b)	10 - 30 µg/m ³ (a) 20 µg/m ³ (b)

(a) Represents the critical level for ecotoxic effects issued by the WHO for Europe; a range is given to account for different sensitivities of vegetation types

(b) EC and UK limit value to protect ecosystems

The World Health Organisation no longer advocates the use of a 24 hour guideline value for the protection of vegetation in view of evidence confirming that peak concentrations are not significant compared with accumulated dose. WHO guidelines for maximum concentrations of sulphur dioxide in ambient air are given as follows for ecosystems:

Crops	30 µg/m ³	Annual mean and winter mean
Forests / natural vegetation	20 µg/m ³	Annual mean and winter mean
Forests / natural vegetation (a)	15 µg/m ³	Annual mean and winter mean
Lichens	10 µg/m ³	Annual mean

(a) for areas where the accumulated temperature sum above +5°C is less than 1000°C per year

Oxides of Nitrogen

Direct exposure to NO_x may cause growth inhibitions in some plants (Table 3). Higher concentrations of NO_x are usually needed to cause injury than for other pollutants such as ozone and sulphur dioxide. Chronic injury, such as chlorosis, may be caused by long-term exposures to relatively low concentrations of nitrogen dioxide but are reversible on young leaves. Acute injury is observed as irregularly shaped lesions that become white to tan, similar to those produced by SO₂. Sensitive plants to NO_x include beans and lettuce, whereas citrus and peach trees are rated as having an intermediary sensitivity. NO_x may also impact indirectly on plants since the oxidation of

NO₂ to nitric acid contributes to acid rain problems. Acid rain serves to increase the leaching of base cations from most soils in affected areas, resulting in the change in the acidity of the soils.

Table 3. Injury to plants caused by various dosages of NO₂.

Symptoms	Concentration ($\mu\text{g}/\text{m}^3$)	Concentration (ppm)	Duration of Exposure
foliar injury to vegetation	3774	2	4 hr
slight spotting of pinto bean, endive, and cotton	1887	1	48 hr
subtle growth suppression in some plant species without visible foliar markings	943	0.5	10-20 days
decreased growth and yield of tomatoes and oranges	472	0.25	growing season
reduction in growth of Kentucky bluegrass	189	0.1	20 weeks

References: (Ferris, 1978; Godish, 1990; Harrison, 1990; Quint *et al.*, 1996).

Critical levels for NO_x, used by the United National Economic Commission for Europe to map exceedance areas, are given as 30 $\mu\text{g}/\text{m}^3$ for annual means and 95 $\mu\text{g}/\text{m}^3$ for a 4-hour mean for agricultural crops, forest trees and natural and semi-natural vegetation.

Air quality criteria issued by the EC and UK for the protection of vegetation against nitrogen oxide exposures are summarised in Table 4.

Table 4. Thresholds specified by certain countries and organisations for vegetation and ecosystems

Pollutant	Averaging Period	Threshold (ppb/ppm)	Threshold ($\mu\text{g}/\text{m}^3$ or mg/m^3)
Nitrogen oxides (NO _x)	annual average	20 ppb(a)	30 $\mu\text{g}/\text{m}^3$ (a)

(a) EU limit value specifically designed for the protection of vegetation