MERCURY - PERSEUS 400 kV TRANSMISSION LINE

BIRD IMPACT ASSESSMENT STUDY

SUPPLEMENTARY REPORT

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EXECUTIVE SUMMARY

This report is an addendum to the main Bird Impact Assessment Study (the main report) compiled in March 2003 for the proposed Mercury-Perseus 400kV transmission line. It deals with the following points raised by the Department of Environmental Affairs and Tourism in the Free State Province:

- Quantifying significant bird impacts
- Specific mitigation measures along Route 1 (the preferred alignment), particularly along different sections where (due to the sensitivity of the section) different mitigation measures may be required; and
- Some measurement of the effectiveness of the proposed mitigation measures (see approval of the Scoping Report).

Any attempt at quantifying the potential bird impacts for the proposed development would entail the capturing of significant amounts of quantitive data. Clearly such detailed studies fall outside the scope of this brief. The most significant impact that is foreseen is collisions with the earthwire of the proposed line. Quantifying this impact in terms of the likely number of birds that will be impacted, is very difficult because such a huge number of variables play a role in determining the risk, for example weather, rainfall, wind, age, flocking behaviour, powerline height, light conditions, topography, population density and so forth. However, from detailed record keeping by the Endangered Wildlife Trust, it is possible to give a measure of what species are likely to be impacted upon, based on historical records. This only gives a measure of the general susceptibility of the species to powerline collisions, and not an absolute measurement for this specific line.

At the level of a desk top study for a line of several hundred kilometers with several alignments, it is not possible to actually demarcate all the sections that need to be mitigated. This can only be done once the alignment has been finalized, and **only by physically traveling the entire length of the final alignment by vehicle and by foot.** It is standard procedure by the Eskom Transmission Group to perform this procedure with the assistance of the Endangered Wildlife Trust once the line has been surveyed. At that stage, specific spans are demarcated for bird flappers, based on a variety of factors (mentioned earlier), and at that stage minor deviations can still be effected. This is also the stage when site specific measures are suggested to prevent habitat destruction for example what areas access roads should avoid.

The most successful method used to date to prevent this from happening in South Africa is to mark the overhead earthwire with anti-collision devices. The most effective device to date is the Bird Flapper. Results at several test sites where this device was used reveal a reduction of post marking mortality of more than 80%.

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1. Introduction

This report is an addendum to the main Bird Impact Assessment Report (the main report) compiled in March 2003 for the proposed Mercury-Perseus 400kV transmission line. This reports deal specifically with points raised by the Department of Environmental Affairs and Tourism in the Free State Province as communicated to the author by the main consultants, Strategic Environmental Focus in a letter dated 14/08/03.

These points are:

- Quantifying significant bird impacts
- Specific mitigation measures along Route 1 (the preferred alignment), particularly along different sections where (due to the sensitivity of the section) different mitigation measures may be required; and
- Some measurement of the effectiveness of the proposed mitigation measures (see approval of the Scoping Report).

2. Quantifying significant bird impacts

The impacts identified in the main report were as follows:

"Red Data species

- Habitat destruction: Any destruction of Wetland/ephemeral pan habitat along the route during construction and maintenance will have a negative impact on the species present, including the following species: Bittern, Greater and Lesser Flamingo, Pinkbacked Pelican, White Pelican, Black Harrier and African Marsh Harrier. The ephemeral pans are of particular concern as they represent 'bird rich' areas in this landscape, during periods of high rainfall.
- Habitat Destruction: Any destruction of Grassland and thornveld habitat along the route during construction and maintenance will have a negative impact on the resident species, including the following species: Blue Crane, Kori Bustard, Secretarybird, Blue Korhaan, Melodious Lark and Shortclawed Lark.
- Disturbance: Disturbance of sensitive species may occur during construction and maintenance activities in any of the habitats along the powerline route. The majority of the more sensitive species are associated with water and so disturbance around pans and wetlands is of particular concern. Generally speaking, disturbance is a short term, temporary impact. The one exception in this case is the Bittern that has been marginally recorded in the area. The secretive nature of the bird make the assessment of impacts

difficult, and the species could be underreported as well for the same reason. This highly sensitive species could permanently abandon suitable habitat if it is disturbed.

- Collisions: Several species occurring particularly in the Grassland and Wetland habitats are vulnerable to collision with the earth wire. The areas surrounding Ephemeral pans are of particular concern as this is where waterbirds may congregate when conditions are favourable. This could include the following species: Pinkbacked Pelican, Greater and Lesser Flamingos. These species, as well as Grassland species such as Blue Cranes use the pans as roosts; hence much flying takes place at low light intensities at dawn and dusk, making collision with earth wire an even greater potential threat. Extensive local movement between pans are likely when conditions are good.

Non Red Data species

- Collisions: The only impact of concern is that of collision with the earth wire. This will probably involve predominantly the storks, ibises and spoonbills, waterbirds and Black Korhaans. This will be particularly pronounced around the Ephemeral pans and wetlands in the area, but may also occur in the arable lands, grasslands and riparian habitat depending on the time of year and food availability. The White Stork is a species for concern as it has a relatively high reporting rate for the study area and will feed wherever its food source (insects) is plentiful. It is known to be particularly attracted to lucerne fields (Barkhuyzen 2002).

It must be pointed out at the onset that any attempt at quantifying the potential bird impacts for the proposed development would entail the capturing of significant amounts of quantitive data, for example one would have to establish how many pairs of a given species are using a particular wetland and document the percentage of habitat loss that could occur if a transmission line is constructed in the wetland. Then the influence on the ability of the population to persist would have to be documented and quantified. Clearly such detailed studies fall outside the scope of this brief. The very fact that impacts such as habitat destruction and disturbance could be significant but difficult to quantify, means that all possible mitigation measures should be implemented on the basis of the pre-cautionary principle.

Precaution – the “precautionary principle” or “precautionary approach” – is a response to uncertainty, in the face of risks to health or the environment. In general, it involves acting to avoid serious or irreversible potential harm, despite lack of scientific certainty as to the likelihood, magnitude, or causation of that harm. Precaution is now an established principle of environmental governance, prominent in law, policy and management instruments at international, regional and domestic level, across such diverse areas as pollution, toxic chemicals, food and phytosanitary standards, fisheries management, species introductions and wildlife trade. The immediate and obvious importance of precaution in the context of natural resource management and biodiversity conservation, where impacts can clearly be both serious and irreversible, has been recognised

through its endorsement by all major biodiversity-related multilateral environmental agreements, as well as myriad policy and legislative instruments at all levels.

The most significant impact that is foreseen is collisions with the earthwire of the proposed line. Quantifying this impact in terms of the likely number of birds that will be impacted, is very difficult because such a huge number of variables play a role in determining the risk, for example weather, rainfall, wind, age, flocking behaviour, powerline height, light conditions, topography, population density and so forth. However, from detailed record keeping by the Endangered Wildlife Trust, it is possible to give a measure of what species are likely to be impacted upon, based on historical records. This only gives a measure of the general susceptibility of the species to powerline collisions, and not an absolute measurement for this specific line. The following table gives the total number of individuals of Red Data species that is relevant to this study that has been recorded as collision victims with powerlines by the EWT since 1 August 1996:

Table 1: Red Data species that is relevant to this study that has been recorded as collision victims with powerlines by the EWT since 1 August 1996

Species	Number recorded
Blue Crane	406
Ludwig's Bustard	152
White Stork (Not Red Data but covered by Bonn Convention on Migratory Species)	134
Greater Flamingo	51
Lesser Flamingo	45
Kori Bustard	44
Secretarybird	27
Cape Vulture	18
White Pelican	11
Martial Eagle	4
Tawny Eagle	2
Peregrine Falcon	1

Based on the figures above, it is clear that large terrestrial birds and large water birds are particularly vulnerable to this impact.

3. Specific mitigation measures along Route 1

The mitigation of bird impacts caused by powerlines is to a large extent determined by the microhabitat within a zone of a hundred metres to about 1km on both sides of the line. This is particularly relevant as far as mitigation for bird collisions are concerned. At the level of a desk top study for a line of several hundred kilometers with several alignments, it is not possible to actually demarcate all the sections that need to be mitigated. This can only be done once the alignment has been finalized, and **only by physically traveling the entire length of the final alignment by vehicle and by foot.** It is standard procedure by the Eskom Transmission Group to perform this procedure with the assistance of the Endangered Wildlife Trust once the line has been surveyed. At that stage, specific spans are demarcated for bird flappers, based on a variety of factors (mentioned earlier), and at that stage minor deviations can still be effected. This is also the stage when site specific measures are suggested to prevent habitat destruction for example what areas access roads should avoid.

Since the main report was compiled in March, new information has become available on the density and habitat use of large terrestrial birds in the north-west Free State (Young *et al* 2003). It confirms the general lack of large terrestrial birds in the study area, which is ascribed to the intensive maize production in the area, as well as the intensive use of agrochemicals over a period of several decades. It also underscores the importance of natural veld (and wetlands in the case of White Storks) for the remaining large terrestrial species. The only exception to this is the Black (Whitequilled) Korhaan, which is found extensively in agricultural landscapes. However, this species has not been recorded as a regular collision victim with powerlines (EWT unp. data.)

Overall this information confirms the initial findings of the main report, namely that grasslands and ephemeral wetlands are the most important bird habitats that will need special attention when the line is built. This habitat is most prevalent in the southern part of the alignment (see appendix B of the main report), where significant ephemeral pans and tracts of grassland is still found. There are also pockets of important habitat elsewhere for (for example wetlands near Welkom) which will require special scrutiny during the physical inspection process described earlier on.

4. Some measurement of the effectiveness of the proposed mitigation measures

As stated earlier, the most important impact that is expected to result from the construction of the powerline is bird collisions with the overhead earthwire. The most successful method used to date to prevent this from happening in South Africa is to mark the overhead earthwire with anti-collision devices. The most effective device to date is the Bird Flapper.

Informal monitoring at two test sites in the Western Cape revealed very encouraging results as far as reduction of bird collisions are concerned, despite problems that were encountered with the devices shifting on the line (that problem has since been rectified with a new design clip):

- Wellington, Western Cape: 22kV line killing flamingos at a roost. Between 200 and 1500 birds present from June to December each year up to January 2000, when birds moved off presumably due to change in water quality. Marked with conventional Bird Flappers alternating red and white.

Pre-marking mortality rate	1.7 birds per month (16 birds in 9 months)
Post-marking mortality	0.3 birds per month (9 birds in 28 months)
Reduction in mortality rate since marking with Bird Flappers	82%
Period of monitoring	1 January 1997 to 1 February 2000 (37 months)

- Caledon, Western Cape: 22kV line killing Blue Cranes at a roost. Birds present year-round and roosting in farm dam. Marked with experimental Luminescent Bird Flapper to make flappers visible at dawn and dusk.

Pre-marking mortality rate	0.6 birds per month (26 birds in 41 months)
Post-marking mortality	0.1 birds per month (1 bird in 9 months)
Reduction in mortality rate since marking with Bird Flappers	84%
Period of monitoring	1 January 1997 ongoing (50 months)

Another example of the successful application of the bird flappers is the Joelshoek Valley Mitigation Project. The combination of wetlands and cultivated lands, along with suitable roost sites makes Joelshoek Valley an ideal for Grey Crowned Cranes. In winter, when the cranes are flocking, flocks of up to 350 individuals have been observed. Aside from the Grey Crowned Cranes, other species such as Spurwing and Egyptian Goose, Sacred Ibis and White Stork occur here in flocks of several hundred. Blue Cranes, Wattled Cranes and Black Storks are occasional visitors.

Since 1996, when monitoring was initiated by the Endangered Wildlife Trust (EWT), at least 31 Grey Crowned Cranes, 15 White Storks, 3 Secretary Birds, 2 Stanley's Bustards and an unknown number of Egyptian and Spurwinged Geese have died through collision with the powerlines. A total of about 10 kilometres, comprising 7 628m of mainline and 3 224m of 22kV spur lines, was subsequently identified as being particularly hazardous and marked with Bird Flappers in June 2001. A total of 1 550 Bird Flappers were installed at 7m intervals with the last one fitted during March 2002. No mortality has been reported since the completion of the project in March 2002 (EWT unp. data).

In the Overberg region of the Western Cape, severe problems are experienced with Blue Crane collisions on 11 and 22kV lines. Since the marking of problem lines with Bird Flappers have started, the problem has been significantly reduced (EWT unp.data):

Table 2: Blue Crane mortality on powerlines in Overberg: Before and after mitigation

EWT Incident Locality Number	Total Blue Crane mortality pre-mitigation	Total mortality post-mitigation to date (Jan 2003)	Date monitoring commenced	Date flappers were fitted
73	34	0	Jan 97	May 2000
321	6	1	Oct 98	Aug 99
337	1	0	Feb 99	Aug 99
550	1	0	March 01	March 2002
561	3	0	April 01	March 2002
562	1	0	April 01	March 02
564	1	0	April 01	March 02
565	1	0	April 01	March 02
566	1	0	April 01	March 02
574	1	0	May 2001	March 02
575	2	0	May 2001	March 02
579	4	0	May 2001	March 02
585	2	0	June 2001	March 02
599	3	0	June 2001	March 02
631	2	0	Nov 2001	March 02
651	3	0	Nov 2001	March 02
699	1	0	Aug 01	Dec 02
713	1	0	Sep 02	Nov 02
714	3	0	Sep 02	Nov 02
Total: 19	**71**	**1**		

Eskom Transmission is currently looking at new bird flapper designs, primarily to reduce the application time of the device, as it has to be done by helicopter (which is very expensive).

5. References

YOUNG, D.J. HARRISON, J.A. NAVARRO, R.A. ANDERSON, M.D. & B.D. COLAHAN (ed). 2003. Big Birds on Farms: Mazda CAR Report 1993 – 2001. Avian Demography Unit. University of Cape Town.