

# Vulture Electrocutions on Vertically Configured medium voltage Structures in the Northern Cape Province South Africa

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## ABSTRACT

In February 1999 the electrocution of two African Whitebacked Vultures was reported on a 22kV single phase, vertically configured line in the Northern Cape Province of South Africa. Up until that time, vertically configured medium voltage designs were considered to be safe for vultures. A year later, a landowner discovered several vulture carcasses below a similar line in the Northern Cape Province. Subsequently, two other landowners also reported dead Cape Griffons, African Whitebacked Vultures and Lappet-faced Vultures under 22kV vertically configured lines on their properties. By September 2002, the electrocution of 46 Lappetfaced Vultures, 24 African Whitebacked Vultures, 4 Cape Griffons and 12 unidentified vultures had been recorded on these designs. Mitigation measures seemed initially to reduce the mortality, but electrocutions continued. It became increasingly clear that there was some unexplained, unrecorded behaviour causing the mortality of the vultures, especially those found away from the actual pole. An experiment was conducted by placing a carcass near a powerline and recording the behaviour of the vultures. The experiment proved that birds expose themselves to electrocution by perching on the conductors and by aggressively interacting on the pole top and insulators. As a result, Eskom, the South African national electricity utility, has stopped building vertically configured medium voltage designs in areas of the Northern Cape Province where it poses an electrocution risk to vultures. A mitigation programme for existing lines in high risk areas has also been initiated.

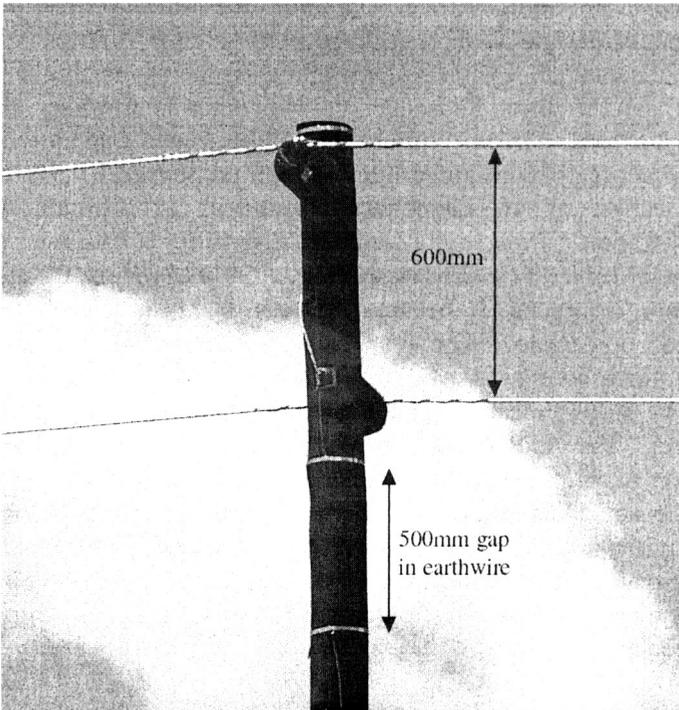
## INTRODUCTION

In February 1999 the electrocution of two African Whitebacked Vultures *Gyps africanus* was reported on a 22kV single phase, vertically configured line near Douglas in the Northern Cape Province. Up until that time, vertically configured medium voltage designs were considered to be safe for vultures, because it was assumed that the birds will always perch on the pole top, away from the potentially lethal conductors. The investigation team from Eskom and the Endangered Wildlife Trust (EWT) could not conclude on the dynamics as to how the birds were electrocuted, but the general feeling was that it was a freak incident. It was recommended that the line should be monitored and any faults that could be due to electrocution of birds must be reported and investigated. No further electrocutions were reported in the next 12 months and the incident file was closed.

In February 2000, Abrie Maritz, project executant of the Kalahari Raptor Project of the EWT, reported to the Eskom-EWT Strategic Partnership that a landowner discovered several vulture carcasses below a 22kV single phase, vertically configured line near the Witsand Nature Reserve in the Northern Cape Province. Subsequently, two other landowners contacted him and also reported dead Cape Griffons *Gyps coprotheres*, African Whitebacked Vultures and Lappet-faced Vultures *Torgos tracheliotos* under 22kV vertically configured lines on their properties.

Due to the serious nature of these reports, a series of investigations was conducted by the Eskom-EWT Strategic Partnership at all sites to try to determine the causes of death and to forward recommendations for possible mitigation measures.

**Figure 1: 22kV single phase, vertically configured design**



## INVESTIGATION RESULTS

Initially, investigations concluded that the most likely cause of death of the vultures was phase to phase electrocution. The reason why specifically vultures were being electrocuted was thought to be related to:

- (a) their size
- (b) their gregarious nature
- (c) limited alternative natural perching substrate and
- (d) the small size of pole-top and hence limited perching area

It was thought that electrocution takes place when a vulture attempts to land on the pole top and loses its grip due to the small size of the top, or when displacement takes place and the interaction causes the vulture to slip between the conductors.

After the first round of investigations in 2000, the investigation team recommended that the top conductor should immediately be insulated with Salisbury sleeves or Preformed Line Products (PLP) sleeves one metre either side of the insulator at all four electrocution sites to prevent further phase to phase electrocutions.

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**Table 1: Total vulture mortalities at all electrocution sites (n=4) identified in the period February 1999 to September 2002**

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<i>Species</i>	<i>Number of mortalities</i>
Lappet-faced Vultures	46
African Whitebacked Vultures	24
Cape Griffons	4
Unidentified vultures	12
<b>Total</b>	<b>86</b>

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## INSULATION

All sites where vultures were reported electrocuted had been mitigated by April 2001, through insulating the top conductors with Salisbury sleeves or Preformed Line Products (PLP) sleeves one metre either side of the insulator. The total cost of mitigation amounted to R57,652.37 (US\$ 7,500) (cost includes manpower, transport and material, but excludes cost of investigations and monitoring).

Although a reduction in mortalities was immediately apparent at the sites insulated, the method had not solved the problem. Electrocuted vultures were still being found between 5–10 metres away from the insulated pole, below the conductors as well as next to poles with insulated conductors. Furthermore, in some instances, the vultures started attacking the insulation by ripping it apart. This, coupled with the continued mortality, clearly indicated that a fresh approach was needed to solve the problem.

It became increasingly clear that there was some unexplained, unrecorded behaviour that was causing the mortality of the vultures, especially those found away from the actual pole. It was therefore decided to gather behavioural data by conducting an experiment. This was done by placing an animal carcass in

close proximity to a line and monitoring the behaviour of the vultures by means of a video camera and personal observation.

## EXPERIMENT TO MONITOR VULTURE BEHAVIOUR

A cow carcass was placed in close proximity to a single phase staggered vertical configuration on the farm Damhoek, owned by one of the authors (Abrie Maritz). The bottom conductor was insulated 2.5 metres on either side of the pole to reduce the risk of vulture electrocutions during the experiment.

The vulture behaviour was monitored by placing a time-lapse video recorder 60m from the pole closest to the carcass. Abrie Maritz furthermore monitored the site using 10x50 binoculars. The experiment revealed the following:

- On 11 April 2002 there were 72 African Whitebacked Vultures, 10 Lappet-faced Vultures and 5 Cape Vultures recorded at the carcass.
- Vultures perched on the pole-tops of various structures in the vicinity of the carcass.
- An African Whitebacked Vulture flew from one of the poles and perched two metres away from the insulation on the bottom conductor, where it perched for three minutes. This behaviour confirmed reports by Eskom Field Services staff who reported vultures roosting on the conductor at night.
- Vultures continuously displaced one another on pole-tops.
- While perching on the poles, some vultures spread their wings (known as “sunning”).
- While one African Whitebacked Vulture perched on top of a pole, another flew from the carcass and perched on the insulation material of the bottom conductor of the same pole. The vulture perching on the pole-top started pecking at the vulture perching below it. The vulture perching on the bottom (on insulation material) moved from the insulation material and climbed onto the bottom stand-off insulator, where it sat for about five minutes. Interaction in the form of pecking continued between the birds during this period.
- Vultures were unstable while landing on the pole-tops.

## CONCLUSIONS

- Vertically configured medium voltage designs hold an inherent risk of electrocution for large gregarious scavenging vultures.
- Vultures found 5-10 metres away from the pole could have been electrocuted while perching on the bottom conductor and simultaneously touching the top conductor (the distance between conductors is less than the perching height of all three species electrocuted).
- Electrocutions could have occurred at poles due to interaction between vultures, causing a vulture to bridge the gap between phases.
- The method of insulating the conductors adjacent to the insulators is not sufficient to prevent vulture electrocutions.

## RECOMMENDATIONS AND SUBSEQUENT DEVELOPMENTS

Following on from the new information that became available as a result of the observations, the following recommendations were put forward to Eskom:

- The current method of insulating conductors with Salisbury sleeves or Preformed Line Products (PLP) sleeves one metre either side of the insulator must be discontinued
- Areas must be identified within the Northern Cape where vultures are most exposed to the risk of electrocution
- All vulture-unfriendly lines in the high risk areas must be identified
- A programme of line modification must be undertaken in the high risk areas to prevent further vulture electrocutions
- The use of vertically configured medium voltage structures for new lines must be discontinued in areas where vultures regularly occur in the Northern Cape

The recommendations were accepted in principal by Eskom. Eskom, the EWT and Northern Cape Nature Conservation Services have since jointly identified high risk areas, based on the known range of vultures in the province and recorded mortality. A final decision on what type of vulture-friendly designs should be used was finalised in January 2003 and the modification of existing vulture-unfriendly lines is set to start in March 2003. The total length of line earmarked for immediate action comes to approximately 480km, at a cost of approximately R2.3m (US \$300,000) excluding labour costs.

## REFERENCES

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