## ENVIRONMENTAL MANAGEMENT PLAN

Mainstream Kangnas Wind Farm

# Avifauna: Avifaunal Walk-Through

## February 2016

**Prepared by:**

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**Prepared for:**
Mainstream Renewable Energy

# EXECUTIVE SUMMARY

South Africa Mainstream Renewable Power Kangnas RF Pty Ltd (Mainstream) has contracted Chris van Rooyen Consulting to perform a avifaunal "walk-through" of the authorised Kangnas Wind Energy Facility (WEF). The WEF is situated approximately 50km from the town of Springbok in the Northern Cape Province, comprises approximately 70 wind turbines and a 132/220kV grid connection of 13.2km.

The terms of reference for this report are as follows:

- To indicate specific mitigation measures that need to be implemented to address potential impacts on avifauna associated with the placement of the turbines and the grid connection; and
- To verify if there is any need for micro adjustment of wind turbine positions due to envisaged impacts on avifauna.

**Displacement due to disturbance during construction**

- Construction activity should be restricted to the immediate footprint of the infrastructure.
- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.
- Measures to control noise and dust should be applied according to current best practice in the industry.
- Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.
- If an active nest of a priority species is encountered in the construction footprint, the nest must not be disturbed and the Environmental Control Officer (ECO) should be informed. The ECO must in conjunction with a suitably experienced avifaunal specialist devise a strategy to minimise the disturbance to the breeding birds. This may involve translocation of the nest, or where that is not deemed possible, it may entail the removal of the eggs or small chicks to a suitably equipped rehabilitation centre, for artificial rearing.
- A 250m no construction buffer zone should be implemented around the Greater Kestrel nest at 29°36'46.17"S 18°22'57.56"E (see Figure 3). This would require the shifting of turbine 44.
- A 250m no construction buffer zone should be implemented around the corvid nest at 29°36'46.17"S 18°22'57.56"E (see Figure 3), on the assumption that the nest may be used by raptors. This would not require the shifting of any turbines.

**Collisions with the earthwire of the grid connection**

It is highly recommended that the earth wire of the entire grid connection is marked with anti-collision devices.

The proposed devices to be used, and the manner of marking is indicated **APPENDIX 1**.

**SPECIALIST EXPERIENCE AND DECLARATION OF INDEPENDENCE:**

**Chris van Rooyen**

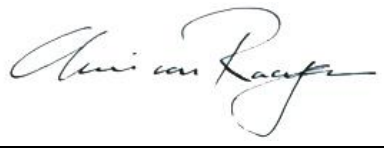
Chris has nineteen years' experience in the management of wildlife interactions with electricity infrastructure. He was head of the Eskom-Endangered Wildlife Trust (EWT) Strategic Partnership from 1996 to 2007, which has received international acclaim as a model of co-operative management between industry and natural resource conservation. He is an acknowledged global expert in this field and has worked in South Africa, Namibia, Botswana, Lesotho, New Zealand, Texas, New Mexico and Florida. Chris also has extensive project management experience and has received several management awards from Eskom for his work in the Eskom-EWT Strategic Partnership. He is the author of 15 academic papers (some with co-authors), co-author of two book chapters and several research reports. He has been involved as ornithological consultant in more than 100 power line and 25 wind generation projects. Chris is also co-author of the Best Practice for Avian Monitoring and Impact Mitigation at Wind Development Sites in Southern Africa, which is currently (2013) accepted as the industry standard. Chris also works outside the electricity industry and had done a wide range of bird impact assessment studies associated with various residential and industrial developments.

**Albert Froneman (Pr.Sci.Nat)**

Albert has an M. Sc. in Conservation Biology from the University of Cape Town, and started his career in the natural sciences as a Geographic Information Systems (GIS) specialist at Council for Scientific and Industrial Research (CSIR). He is a registered Professional Natural Scientist in the field of zoological science with the South African Council of Natural Scientific Professionals (SACNASP). In 1998, he joined the Endangered Wildlife Trust where he headed up the Airports Company South Africa – EWT Strategic Partnership, a position he held until he resigned in 2008 to work as a private ornithological consultant. Albert's specialist field is the management of wildlife, especially bird related hazards at airports. His expertise is recognized internationally; in 2005 he was elected as Vice Chairman of the International Bird Strike Committee. Since 2010, Albert has worked closely with Chris van Rooyen in developing a protocol for pre-construction monitoring at wind energy facilities, and they are currently jointly coordinating pre-construction monitoring programmes at several wind farm facilities. Albert also works outside the electricity industry and had done a wide range of bird impact assessment studies associated with various residential and industrial developments.

**DECLARATION OF INDEPENDENCE**

I, Chris van Rooyen as duly authorised representative of Chris van Rooyen Consulting, and working under the supervision of and in association with Albert Froneman (SACNASP Zoological Science Registration number 400177/09) as stipulated by the Natural Scientific Professions Act 27 of 2003, hereby confirm my independence (as well as that of Chris van Rooyen Consulting) as a specialist and declare that neither I nor Chris van Rooyen Consulting have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of the Kangnas Wind Farm walk-through other than fair remuneration for professional services performed.



## 1. BACKGROUND

Mainstream Renewable Power (Mainstream) has contracted Chris van Rooyen Consulting to perform a avifaunal "walk-through" of the authorised Kangnas Wind Energy Facility (WEF). The WEF is situated approximately 50km from the town of Springbok in the Northern Cape Province, comprises approximately 70 wind turbines and a 132/220kV grid connection of 13.2km.

Figure 1 below is a satellite image of the planned lay-out of the wind turbines, and the grid connection.

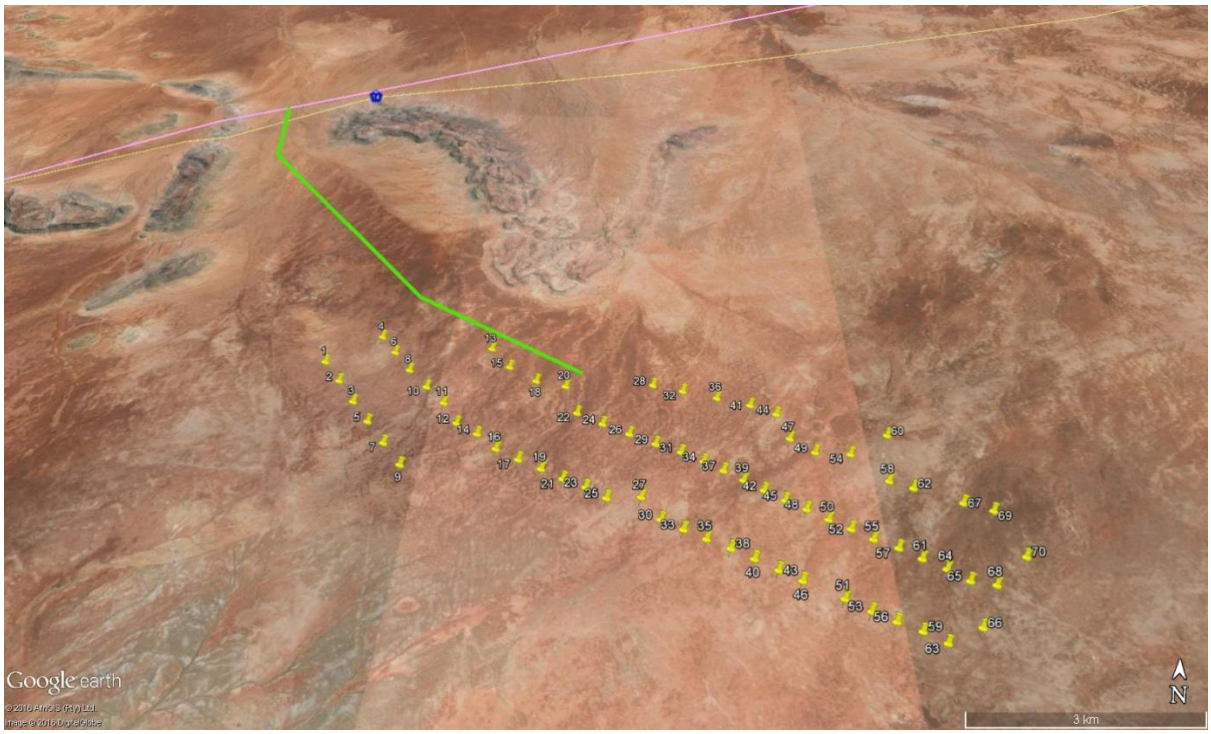



Figure 1: Map of the proposed lay-out of the Kangnas WEF (yellow placemarks) and grid connection (green line).

## 2. TERMS OF REFERENCE

The terms of reference for this report are as follows:

- To indicate specific mitigation measures that need to be implemented to address potential impacts on avifauna associated with the placement of the turbines and the grid connection; and
- To verify if there is any need for micro adjustment of wind turbine positions due to envisaged impacts on avifauna.

## 3. ASSUMPTIONS AND LIMITATIONS

- The final layout of the wind turbine positions and the grid connection was received from Mainstream in Google Earth format on 10 November 2015. The wind turbine

lay-out is contained in a file called: 20151013-Kangnas-DNVGL-70T-V110_2.0-140MW-7X3RD-210deg-BAv11-UTM34s-FC L....kmz. The grid connection is contained in a file called: Kangnas grid route Feb 14.kmz. It is assumed that the positions are accurately indicated, and it was used as the basis for proposed micro-adjustments.

- It was deemed futile to survey an area at each turbine position for ground nesting species as the species involved, e.g. larks, korhaans and bustards, unlike raptors, do not build conspicuous nests at a specific locality which is likely to be used every year. Pre-emptive buffer zones would therefore not be effective. Instead specific mitigation measures are recommended should a priority species nest be encountered during the construction of the turbines (see 5.1 below).

## 4. METHODS

- The site was investigated on 3 and 4 February 2016, on foot and using a 4 x 4 vehicle.
- Nesting data contained in two reports, namely the Avifaunal Impact Assessment (Harebottle 2012) and the pre-construction monitoring report (Bio3 2013) were also considered in the recommendations. The investigations focused on potential priority raptor species breeding habitat and in particular rocky outcrops, boreholes and trees located within or very close to the turbine area.

## 5. RESULTS

- During the investigation a Greater Kestrel (*Falco rupicoloides*) nest with two adult birds perched close to the nest was recorded at 29°36'46.17"S 18°22'57.56"E in a Mesquite (*Prosopis spp*.) tree close to a borehole. This was taken as an indication that the nest is active.
- A nest originally constructed by a corvid, most likely a Pied Crow *Corvus albus,* was recorded on a rocky outcrop at 29°39'42.48"S 18°23'42.29"E with large amounts of whitewash. The possibility exists that the nest could be also used by a raptor species, particularly a Greater Kestrel or Rock Kestrel *Falco rupicolus,* and should therefore be treated as potentially sensitive.
- Cognisance was taken of previously recorded nests particularly two Verreaux's Eagle nests recorded during the pre-construction monitoring with an approximate location of 29°31'4.49"S 18°18'26.34"E. The birds were not observed during the site visit.

See Figures 2 and 3 below for the location of the nests at the Kangnas WEF.

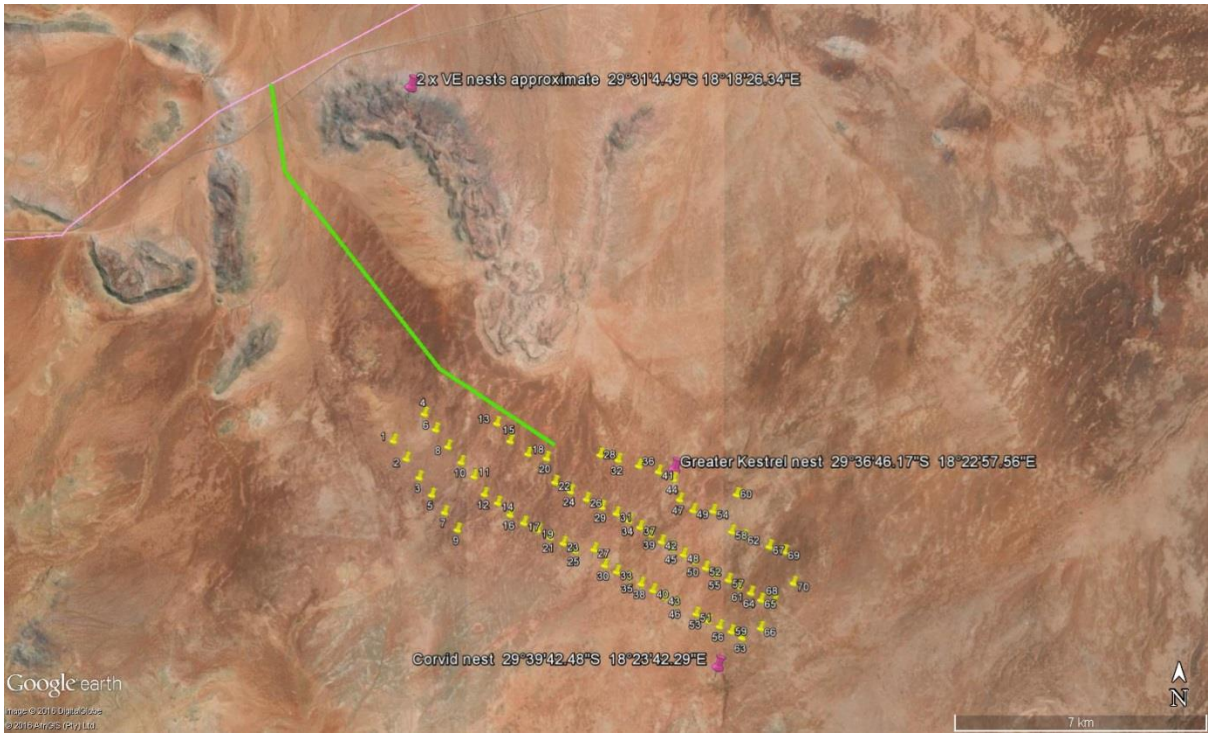



Figure 2: The location of key nests relative to the Kangnas turbine lay-out and grid connection.

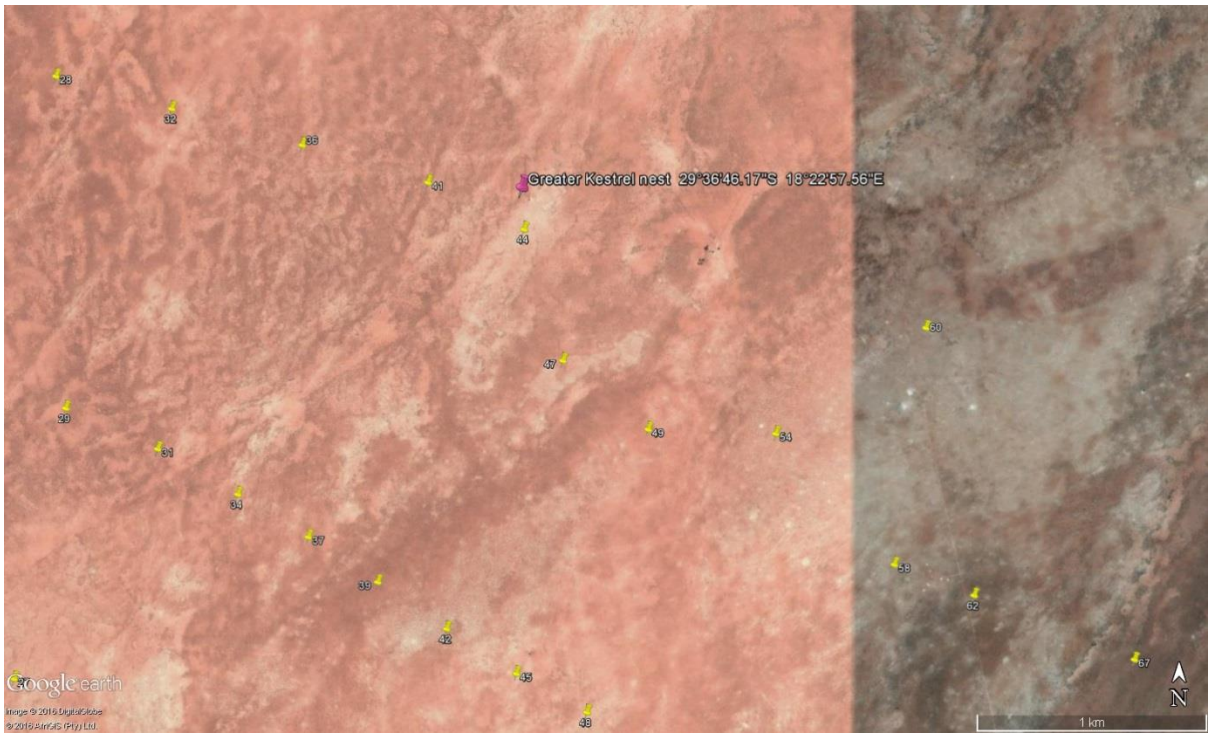



Figure 3: A closer view of the Greater Kestrel nest location.

# 6. IMPACT MITIGATION

## 6.1 Displacement due to disturbance during construction

- Construction activity should be restricted to the immediate footprint of the infrastructure.
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## 6.2 Collisions with the earthwire of the grid connection

Several power line collision prone priority species were recorded during the pre-construction monitoring by Harebottle (2102) and Bio3 (2013). These include Ludwig's Bustard, Kori Bustard, Karoo Korhaan, Secretarybird, Verreaux's Eagle and Northern Black Korhaan. Due to the uniformity of the vegetation within the study area and the current understanding of power line collision risk in birds, attempting to proactively identify high risk sections of power line (especially for species with unpredictable movement patterns such as the terrestrial species mentioned above) is difficult (Bevanger 1994, Jenkins *et al.* 2010, Barrientos *et al.* 2011), given the number of localised factors that contribute to the cause of collisions (Shaw, 2013). Furthermore there is likely to be regular movement of the pair of Verreaux's Eagles across the proposed alignment when moving between the nesting area and foraging areas to the west (pers.obs). It is therefore highly recommended that the earth wire of the entire grid connection is marked with anti-collision devices.

The marking of the earth wire with anti-collision devices is a standard practice world-wide to mitigate for avian impacts. This measure has been proved to be reasonably successful in reducing collisions, with success rates of up to 60% reduction in mortality and even more documented (see Jenkins *et al.* 2010, Hoogstad 2015).

The proposed devices to be used, and the manner of marking is indicated **APPENDIX 1**.

## 7. REFERENCES


- Barrientos, R., Alonso, J.C., Ponce, C., Palacín, C. 2011. Meta-Analysis of the effectiveness of marked wire in reducing avian collisions with power lines. Conservation Biology 25: 893-903.

- Bevanger, K. 1994. Bird interactions with utility structures: collision and electrocution, causes and mitigating measures. *Ibis* 136: 412-425.

- Bio3 (2013). Kangnas wind energy facility – Bird community monitoring. Pre-construction phase. Final report.

- Harebottle, D. M. 2012. Construction of Wind Energy And Solar Energy Facilities, Near Springbok, Northern Cape, Avifaunal Impact Assessment.

- Hoogstad, C. 2015. Email to the author on 5 June 2015 by the manager of the Eskom-EWT Strategic Partnership.

- Jenkins, A.R., Smallie, J.J. & Diamond, M. 2010. Avian collisions with power lines: a global review of causes and mitigation with a South African perspective. Bird Conservation International 20: 263-278.

- Shaw, J.M. 2013. Power line collisions in the Karoo: Conserving Ludwig's Bustard. Unpublished PhD thesis. Percy FitzPatrick Institute of African Ornithology, Department of Biological Sciences, Faculty of Science University of Cape Town May 2013.

## APPENDIX 1 BIRD FLIGHT DIVERTERS

# DISTRIBUTION
# TECHNICAL BULLETIN

3 April 2009 Enquiries:
B P Hill

Tel: (011) 871 2397

**TECHNICAL BULLETIN: 09 TB – 01**
**PART: 4 - MV**

**APPROVED BIRD FLIGHT DIVERTERS TO BE USED ON ESKOMS LINES (MITIGATING DEVICES)**

This Technical Bulletin replaces all other Technical Bulletins that were published previously.

The following two flight diverters (mitigating devices) have been successfully installed and successfully tested on an active line in the Colesberg area.

**1) EBM Flapper**

**Buyers guide number DDT 3053**

The EBM bird flapper tested for the following:

Pull down test (spirally moving along the conductor) for squirrel and Hare conductor

Testing for radio interference at 27kv on fox conductor

Testing for corona at 27kv on fox conductor

Salt fog test for 1000 hours.

The flapper was installed live line on a line in the NW region in conjunction with EWT and proved very successful as a mitigating device.

From field experience and the testing of the flapper it was decided at the Envirotech work group meeting that this EBM flapper can be used on conductors ranging from 6mm to 24mm on ACSR, AAAC conductors and shield wires.

The EBM Flapper can be attached with a link stick and a standard attachment or by hand from a bucket live line or under dead conditions.

Contact Roger Martin: EBM Tel 011 288 0000

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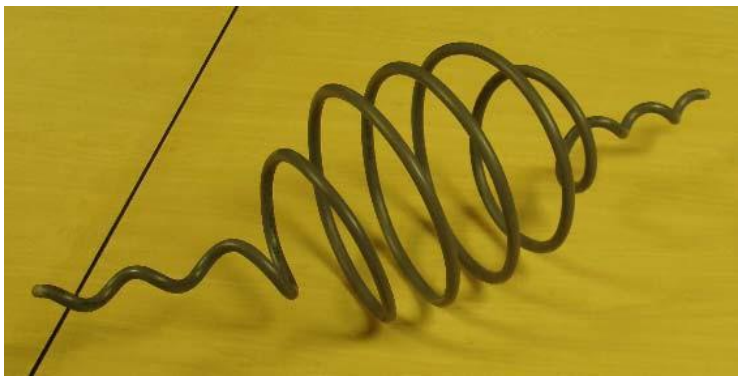
**2) Tyco Flight Diverter.**



**<u>Buyers guide number DDT 3107</u>**

The TYCo flight diverter has been used successfully in many places around the world and has been installed on a line in the NW region in conjunction with EWT and proved very successful as a mitigating device. The device is supplied in colours white and grey.

Contact person: Mr Silas Moloko: TIS Tel 011 635 8000

### 3) Installing Flight Diverters

- Spacing of the bird diverters are to be 5m apart alternating on each phase, for single phase lines the colours would alternate 5m apart on the two lines.
- The flight diverters are to be installed with alternating colours,

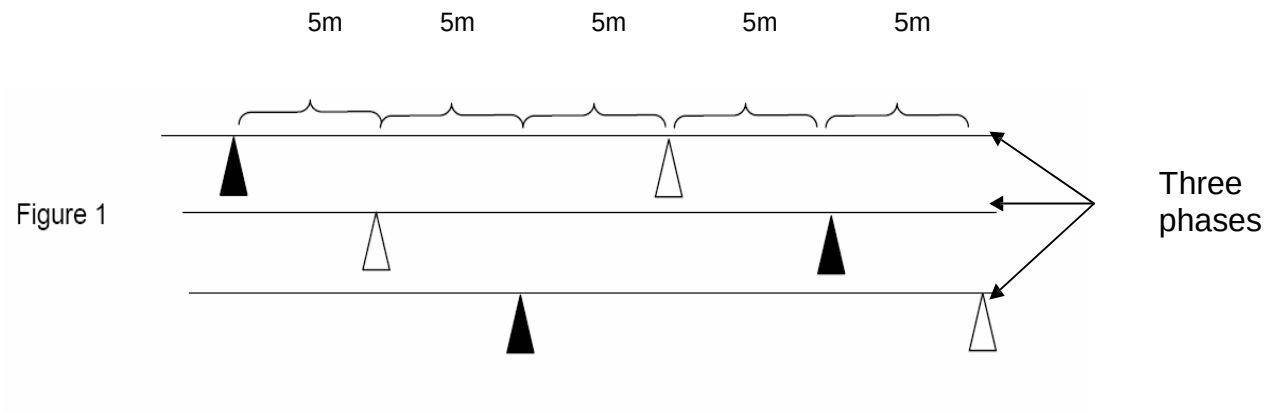



Figure 1

***Signed***

COMPILED BY:

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**B P Hill**
**Chief Engineer**
**IARC**

***Signed***

APPROVED BY:

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Eskom Distribution

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