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Attention: Committee Secretary

House of Representatives Select Committee on the Recent Australian Bushfire

Please find attached TransGrid's submission to the above Committee.

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Submission No.304

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Secretary
TransGrid

TRANSGRID'S SUBMISSION TO
"SELECT COMMITTEE ON RECENT AUSTRALIAN BUSHFIRES"

SUMMARY OF MAIN POINTS

- TransGrid maintains and operates 11,000 route kilometres of high voltage transmission lines traversing much of New South Wales.

- These transmission lines are generally constructed on easements across private or public land. The widths of these easements are between 45 metres and 70 metres.

- TransGrid is required to maintain the transmission lines and easements in accordance with the Electricity Supply (Safety & Network Management) Regulation 2002 and to have in place a Bush Fire Risk Management Plan.

- TransGrid's Bush Fire Risk Management Plan requires assets to be maintained to minimise the risk of fire ignition from the assets and to ensure vegetation clearances from high voltage lines are maintained in order to prevent bushfire initiation due to arcing.

- Bushfires can have a major impact on the reliability of electricity supply due to the forced outages of transmission lines or direct damage to the assets themselves.

- TransGrid maintains vegetation clearance on transmission lines taking into account technical standards, environmental considerations, cost factors and the requirements of the community and property owners.

- Where TransGrid easements have a relatively low level of vegetation cover they have been used by fire control agencies to control and prevent the spread of bushfires.

- There is the opportunity for a management plan to be developed which identifies those transmission line easements which are of strategic significance from a bushfire control perspective and for those easement to be maintained in a manner which:

    - maximises the potential for bushfire control

    - minimises the potential for electricity supply interruptions

    - minimises the long term impact on the environment

    - reduces costs and creates a safe work environment for maintenance and fire personnel.

1. Introduction

TransGrid is the owner, operator and manager of the high voltage electricity transmission network between generators, distributors and directly connected end users in New South Wales as well as transmission interconnections with Queensland and Victoria. The system is a major part of one of the most extensive systems in the world comprising of 76 substations and power station switchyards and 11,000 route kilometres of transmission lines.

The system which has a replacement value of more than $4 billion, operates at voltage levels of 500, 330, 220 and 132kV (thousand volts). The substations are located on land owned by TransGrid and the transmission lines of steel tower, concrete or wood pole construction are generally constructed on easements acquired across private or public land. The easements range in width from 45 to 70 metres.

The main backbone of the network stretches from Queensland to Victoria, primarily along the eastern seaboard and paralleling the Great Dividing Range. In main population centres such as Newcastle, Sydney, Wollongong and Canberra the network forms a "ring" around the centres. Maps of the Network are attached.

TransGrid's assets have the capacity to initiate bushfires and for this reason TransGrid has in place strategies and actions to minimise the risk of this happening. Conversely bushfires have the capacity to directly damage TransGrid assets, effect reliability and quality of electricity supply and impact upon electricity prices in the national electricity market.

This submission details TransGrid's strategies and actions to minimise the potential for bushfire initiation and the impact that bushfires have on TransGrid's assets and reliability of supply.

The submission concludes with a recommendation on how TransGrid's easements could be strategically used for improved bushfire prevention and control.

2. TransGrid's Bushfire Risk Management Strategies

2.1 General

TransGrid's transmission line assets traverse the state and are generally located in rural and semi-rural areas. These areas have periods of high fire danger and the majority of transmission line corridors in these areas have sections of dense vegetation at risk of bushfire. TransGrid's risk approach to asset management assumes that every transmission line has the potential to be impacted by fire, or to initiate fire, including bushfire.

TransGrid is also obliged to provide a safe, environmentally responsible, reliable and secure Network in accordance with its obligations to the community and the National Electricity Market. The asset management and operational strategies therefore encompass all these issues including bush fire risk management.

2.2 Specific Strategies

The following strategies are the elements of TransGrid's asset management and operational strategies specific to bushfire risk management. These elements include policy, standards, processes and procedures that together meet the requirements of the Electricity Supply (Safety & Network Management) Regulation 2002.

(a) To identify bush fire prone areas within the TransGrid supply area, and a process for identifying network assets capable of initiating bush fires, and a system to ensure that this information is kept up to date.

(b) To ensure that the identified network assets located in bush fire prone areas are inspected, and maintained in accordance with a suitable maintenance schedule.

(c) To ensure tree clearances, in particular in bush fire prone areas, are maintained in accordance with appropriate codes, standards and guidelines.

(d) To review equipment types or construction methods known in their operation or design to have bush fire ignition potential, and the mitigation strategies in relation to their use.

(e) To record any complaints in relation to bush fire risk management and to undertake appropriate investigations and remedial actions.

(f) To liaise and consult with the NSW Rural Fire Service, NSW Fire Brigades, local government and other relevant government departments regarding bush fire related matters.

(g) To inform the general public about the fire hazards associated with overhead power lines and vegetation, particularly during storms and conditions of high fire hazard.

(h) To ensure that during conditions of very high fire danger, special procedures and precautions are taken by staff and contractors to minimise the risk of bush fire ignition potential by network assets or work practices.

3. Specific Bushfire Risk Management Actions

3.1 Transmission Lines

TransGrid's risk approach to asset management strategy is to ensure that no asset will initiate fire irrespective of the location of that asset. Each line is classified according to various risk issues including bush fire risk due to vegetation density and regrowth rates.

The classification of lines into specific maintenance regimes is reviewed annually. The schedule of lines and their classification is maintained in Asset Management Standard "Transmission Lines Classifications".

These classifications are defined in Asset Management Standard "Inspection and Maintenance of Transmission Lines". This standard requires each TransGrid Region to classify lines, or sections of line, into an appropriate classification taking into consideration the following key criteria:

(a) System importance with regards to reliability of supply and the possible impact of this line on generators, the National Electricity Market and customers;

(b) Condition of the line;

(c) Public safety and easement encroachment considerations;

(d) Local environmental conditions e.g. high corrosion or high termite activity areas; and

(e) Vegetation density and growth patterns and associated bushfire initiation risks.

Applicable Asset Management Standards:

- *GMASL1001 "Inspection and Maintenance of Transmission Lines"*
- *GMASL7001 "Transmission Lines Classifications"*

3.2 Vegetation Management

TransGrid has established maintenance practices that ensure adequate conductor to vegetation clearances are maintained, to eliminate the possibility of bushfire initiation due to arcing. These standards ensure sufficient distances are maintained to prevent flashover under all environmental conditions and under all line loadings.

Both planned and defect vegetation works are determined on a "priority code" basis to ensure controlled execution of forward works programmes and attention to all defects in the appropriate timeframes.

Asset Management Standard "Assessment and Classification of Transmission Line Defects" is a risk-based approach to classify defects according to their potential impact on system security and safety and specifies the response required to attend to those defects.

Applicable Asset Management Standards:

- *GMAS L1 002 "Maintenance of Easements and Access Tracks"*
- *GM AS L2 003 "Assessment and Classification of Transmission Line Defects"*

4. Impact of Bushfires on TransGrid's Assets

The major impact that bushfires normally have on TransGrid's high voltage network is on the tripping of transmission lines that generally traverse open or timbered land in public areas. Due to the amount of fuel underneath the lines the impact is normally greater in National Parks.

The tripping of a transmission line is caused by the smoke or flame from the fire creating a path for electricity to flow from the wires to the ground in a similar way to a lightning strike. In order to extinguish the arc and prevent damage to the transmission line, automatic protection devices located at the remote substations are able to detect and clear the fault within a very short time, typically one tenth of a second.

Once the arc is extinguished, the protection devices automatically reclose the line and it remains in service unless the conditions are such that the arc is re-established in which case the line trips again and remains out of service. It is the tripping and automatic reclosing that not only protects the equipment but also ensures that the transmission lines are out of service for as short a time as possible.

The impact of bushfires on the high voltage network can be summarised as follows:-

- Direct damage to assets resulting in loss of transmission capacity and potential loss of supply to customers. This is more likely in country and rural areas where the structures are constructed using wooden poles. As TransGrid is a bulk supplier of electricity the direct damage to more than one transmission line is likely to lead to widespread power interruption and total loss of supply to major country towns.

- Continued tripping of lines resulting in voltage surges and permanent outages where the fires continue along the easement. This type of impact is more likely in urban areas where the structures are constructed from steel towers. Continued tripping of lines and concurrent permanent outages has a significant impact on business and commerce due to loss of essential services and potentially a total loss of supply.

In recent years bushfires have had an increasing impact on TransGrid's high voltage network in terms of damage to assets and electricity supply to consumers. Brief descriptions of the impact of major fires follows:

- In December 2001 – January 2002, the first major bushfires since 1994, there was approximately 188km of TransGrid's network exposed to fires. These fires were predominately in the outer urban areas surrounding Sydney. The bushfires caused 116 transmission line outages on the main 330kV network and tripped a number of the lines connecting Sydney to the generating power stations.

- Whilst there was no major damage to TransGrid's assets or extended loss of supply the forced outages and voltage fluctuations did have a major impact on the National Electricity Market and householders in the outer western Sydney area.

- In December 2002 major bushfires again surrounded Sydney, but this time much closer to the inner urban areas. In one short period of three days there were 140 line trips with the worst of the trips causing severe voltage fluctuations in the Sydney CBD. These voltage fluctuations had a significant impact upon the CBD with computers and control systems shutting down.

  Due to the structures being constructed of high tensile galvanised steel there was no major damage to assets. There was however a major risk of loss of electricity supply to Sydney as nearly all the lines to the generation stations were impacted by the fires.

- In January 2003 major bushfires started in southern NSW in areas such as the Snowy Mountains and Brindabella National Parks. During these bushfires there were 64 line trips over a period of 24 days.

  These fires had an impact upon the network between NSW and Victoria and upon the generation flowing out of the Snowy Mountains. The fires also damaged a number of TransGrid wooden pole structures and caused a loss of supply to towns in southeastern NSW.

5. Easements and Bushfire Management

During the recent bushfires TransGrid's high voltage easements have been used by fire agencies for the fighting or control of fires. This has involved either direct fighting of the fires, creating of firebreaks and/or initiating back burning.

A number of the easements on which fire fighting or control activities have occurred have been cleared of tall and fast growing timber species. These easements have very low growing vegetation established resulting in low residual fuel loads and, combined with their associated access tracks, have provided a natural vantage point for fire fighting activities.

Other easements have been "restrictively cleared" with minimal removal of timber allowing heavy undergrowth to establish. A number of these easements were extensively bulldozed by fire control agencies for the purpose of the recent fire fighting activities. These activities occurred in the Blue Mountains National Park, Brindabella National Park and the Kosciusko National Park.

When easements with heavy vegetation growth are bulldozed for emergency bush fire activities, damaging environmental impacts occur and remediation is subsequently required.

6. Future Strategic Opportunities

As TransGrid's transmission lines traverse most of New South Wales and in particular the more heavily timbered and densely populated eastern seaboard there is an opportunity to use the transmission line easements for strategic bush fire prevention and control.

In terms of bushfire prevention and reliability of supply TransGrid is required to manage vegetation such that it does not encroach upon the power line. The extent of vegetation management is determined by a range of factors such as landholders requirements, environmental factors, development consents and cost. Very rarely is the potential for increased bushfire prevention or control taken into account in the vegetation management decision-making process.

In areas where landholders or environmental controls require TransGrid to lop trees and leave the remnants on the forest floor there is a gradual build up in undergrowth and ground fuel. In this situation ongoing maintenance becomes increasingly costly and hazardous as well as increasing the bushfire risk.

In other locations such as in sections of the Snowy Mountains where easements are maintained with only low vegetation cover and minimal remnant fuel the maintenance costs, environmental impact, bushfire prevention and control and reliability of electricity supply is minimised.

7. Recommendation

It is recommended that the following actions, commenced with the NSW Rural Fire Service, be adopted:

a) determine those TransGrid transmission lines that may provide a strategic advantage for bushfire prevention and control, and

b) develop easement management plans for those transmission lines to maximise the outcomes of bushfire mitigation, environmental impact, safety, cost and reliability of supply.