

ISSC 33

Guideline for Network Configuration During High Bush Fire Risk Days.

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PREFACE

The December 2007 Guideline was prepared for the Industry Safety Steering Committee by a working group of NSW electricity distribution network operators facilitated by the then Department of Water and Energy (DWE). Their final draft was forwarded for review by all affected industry parties with comments and alterations incorporated in the final document. The electricity distribution network operators included are responsible for the design, construction, operation and maintenance of electricity network infrastructure, including overhead power lines, for the purpose of supplying electricity to customers.

Following the 2009 major Victorian bushfires and subsequent Royal Commission the Industry Safety Steering Committee reconvened the working group to examine whether this Guideline required update or amendment.

The working group's report to the December 2010 meeting of the Industry Safety Steering Committee was that no change to the Guideline was required. The Industry Safety Steering Committee accepted this recommendation and the Guideline is thus re-issued noting the conduct of the review and with the revised issue date.

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1 Contributions

In the development of this Guideline, discussions were held with the following parties:

Network Operators

Country Energy
EnergyAustralia
Integral Energy
TransGrid
RailCorp

Regulators

Department of Water and Energy, NSW

Other Organisations

NSW Rural Fire Service

2 Disclaimer

While due care has been exercised in the compilation of this Guide much of the content has been sourced externally to an ISSC working group formed to compile this guide. Thus the working group cannot accept responsibility for the content.

This guide is designed on the basis that it will be used in its entirety, and persons who use or observe parts of the publication without paying heed to the entirety of the publication do so at their own risk.

This guide has been prepared on the basis that the user will have a certain minimum level of technical qualifications and/ or experience. The Guide is not intended for use by untrained or unqualified persons, and any one in that category using the guide does so at his/ her own risk.

This guide does not purport to ensure compliance with all the relevant statutes and regulations, such as occupational health and safety laws. Users must satisfy themselves as to the requirements of all relevant laws.

3 Purpose

This guide has been produced to provide a methodology to NSW Network Operators for making decisions on whether different network configurations should be used during *high bush fire risk days*.

4 Introduction

The Guideline is to provide a preferred approach to be used by network operators. However it does not substitute for, or override any relevant legislation, regulation or safety rules implemented by jurisdictional regulators or *network operators*. However, it may be used as reference material for an industry-based approach to the consistent interpretation and implementation of legislation.

Under the Electricity Supply (Safety and Network management) Regulation 2002, the Director General of DWE may nominate any industry code or guide to be taken into account in developing Network Management plans. It is expected that this guide will be 'nominated to be taken into account'.

This guide should be read in conjunction with other standards and guides which refer to the specific kind of work concerned. These will contain references to the various items of equipment involved, work practices, testing regimes and safety considerations.

5 Definitions

The *bush fire danger season* is as declared by the Commissioner of the NSW Rural Fire Service for one or more Weather Forecast Districts.

Bush fire risk day means any day which falls within the *bush fire danger season*.

Electricity network or network means transmission and distribution systems consisting of electrical apparatus which are used to convey or control the conveyance of electricity between the generator's points of connection and customers' points of connection.

High bush fire risk day means any day on which a *TOBAN* has been declared.

Network operator means the owner, controller or operator of an *electricity network*.

TOBAN means total fire ban as may be declared by the Commissioner of the NSW Rural Fire Service for one or more Weather Forecast Districts.

Reclosing Devices means a circuit breaking device that interrupts supply when a fault on the network occurs downstream of the device. Reclosing devices (if enabled) will, after a predetermined time, re-establish supply automatically. If the fault persists then the reclosing device will open and reclose again in a pre-determined manner until permanently interrupting supply for a persistent fault.

Bush fire prone areas are as defined by the local network operator under their Bush Fire Risk Management Plan, and may be derived from bush fire prone land maps prepared by local councils in accordance with the Rural Fires and Environmental Assessment Legislation Amendment Act 2002 and formally certified by the Commissioner of the NSW Rural Fire Service.

6 Network Configuration During High Bush Fire Risk Days

6.1 General

The working group in preparing this guide approached the question from a risk management perspective and examined risks that may be reduced by disabling reclose devices and those risks that may be increased or introduced by adopting this practice.

Network operators are encouraged to follow the risk management approach when determining whether disabling reclose devices is an appropriate network configuration.

Reclosing devices are generally installed either as stand alone equipment or incorporated within circuit breakers, and are designed to automatically restore supply following a trip. This pattern of reclosing may be repeated a small number of times. If the cause of the original fault persists, then the device will cease automatically attempting to restore supply and generally staff will be dispatched to patrol the affected feeder.

6.2 Risks Mitigated by Disabling Reclose Devices

In the circumstances where the cause of the fault is not transient (i.e. the cause persists and the reclosing device recloses) additional energy will be released at the fault site when compared to the non reclosing alternative. The additional energy released into a fault, given particular circumstances, could increase the risk of initiating a bush fire. Thus disabling reclosing devices could in certain circumstances reduce the risk of initiating a fire.

6.3 Risks Increased or Introduced by Disabling Reclose Devices

Disabling automatic reclose devices can in certain circumstances introduce additional risks, particularly to the community supplied by the portion of the network being reviewed. The following risks should be considered when determining whether reclosing devices be disabled during *high bush fire risk days*. These risks are in two broad categories:

- Increased likelihood of initiating a fire.

Some reclosing devices have been set to open after a longer period than that used when the reclosing function is enabled. This is particularly the case for older type reclosers with limited flexibility in settings, or where the recloser has been set to operate quicker on initial reclose than a down stream fuse, but slower if the fault proves to be persistent.

In these cases the amount of energy delivered into the fault will be higher if the reclosing device is disabled (and the fault is transient in nature) than if the recloser is left enabled.

- Reduced network reliability.

If the cause of the circuit breaker or recloser tripping is a transient fault, then supply to an area will be unnecessarily interrupted for a sustained period. This in turn may introduce a number of risks to the community including:

- Loss of supply to critical water supply pumping stations which may impact general health as well as fire fighting strategies.
- Loss of supply to community facilities such as petrol stations and communications facilities, which again may impact on emergency service response strategies.
- Loss of supply to critical community facilities and customers such as hospitals, nursing homes, customers using life support systems, traffic light systems, etc.
- Loss of supply to rail facilities which may increase the risk of trains being stranded in an area under threat by a fire

6.4 Balancing Reclose Decision Risks

The working group undertook a macro study and examined from a likelihood and consequence perspective the risks both mitigated and introduced by disabling reclosers. At this macro level the group found that the risks were of similar magnitude and were quite small in magnitude from a community bush fire risk perspective. The group found that the risks introduced by disabling reclosers generally outweighed the risks mitigated by disabling reclosers. Thus a strategy of mandatory disabling reclosers to mitigate the risk of bush fire initiation could not be supported.

However network operators should undertake their own risk analysis to determine whether any changes to network configuration should be used during high bush fire risk days. In determining whether reclose devices should be disabled during *high bush fire risk days*, the following should be considered:

- Pre bush fire season inspections and defect rectification programs.
- Feeder performance – i.e. do the feeders in question have particularly poor reliability performance and hence high likelihood that faults will not be transient.
- Historical data of bush fire initiation from electrical network assets.
- Other bush fire risk mitigation strategies (see below).

6.5 Other Risk Mitigation Strategies

When determining whether it is appropriate to disable reclosers as a fire mitigation strategy, the following other risk reduction strategies should be considered:

- Reduction in the likelihood of LV clashing faults by installing LV line spreaders.
- Regular vegetation management programs.
- Pre bushfire season inspections & defect rectification.
- Management of the above programs for private overhead lines.

7 References

Risk and Reliability – An Introductory Text, 5th Edition, Risk and Reliability Associates Pty Ltd, www.r2a.com.au.

AS/NZS 4360:2004 Risk Management.