Bushfire Mitigation Plan

Electricity Distribution Network

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Foreword

Welcome to AusNet Services' Bushfire Mitigation Plan (the Plan).

The Plan outlines how we will manage our electricity distribution network to mitigate bushfire risk and fulfil our commitment to provide our customers with a reliable and safe electricity supply.

As the owner and operator of electrical assets, AusNet Services is required under the *Electricity Safety Act (1998)* to provide a Plan (5-yearly), including requirements set out in the *Electricity Safety (Bushfire Mitigation) Regulations (2023),* for approval by Energy Safe Victoria (ESV).

The Plan is subjected to annual internal and external review to provide an objective and robust framework for its continued development, including the adoption of emerging technologies and innovative ideas.

As the sponsor of our Network Safety Management Committee, I trust this Plan conveys key aspects of our Bushfire Mitigation Program and welcome contributions for the continued development of its effectiveness.

Andrew Linnie

Executive General Manager

Distribution

Signatories to the Bushfire Mitigation Plan:

Prepared by

Hawaii Ho

Bushfire Mitigation Manager

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1. SCOPE

The Bushfire Mitigation Plan (the Plan) describes AusNet Services' preventative strategies, procedures and processes within its Asset Management System used to monitor, investigate, report, analyse and implement programs to mitigate the risk of fire ignition associated with its supply networks. The Plan also describes the processes concerning management of customer private overhead electric lines.

2. OBJECTIVES

2.1 OVERVIEW

The Bushfire Mitigation Management Plan (the Plan), as required by the *Electricity Safety Act 1998*, forms part of our approved Electricity Safety Management Scheme (ESMS).

The ESMS ensures our Asset Management System has the appropriate structure of policies, processes, procedures and standards that will deliver our strategic objective of providing our customers with a safe and reliable electricity supply.

The Plan describes the policies, strategies and procedures within the Asset Management System that form our bushfire mitigation program, together with the processes for implementation, monitoring and review to ensure the Plan remains effective.

In addition to our ESMS, which is approved by Energy Safe Victoria, AusNet Services maintains quality assurance over its Asset Management System through certification to AS/NZS 4801 -- Occupational Health & Safety Management Systems, ISO9001 – Quality Management Systems, ISO14001 – Environmental Management System and ISO55001 – Asset Management.

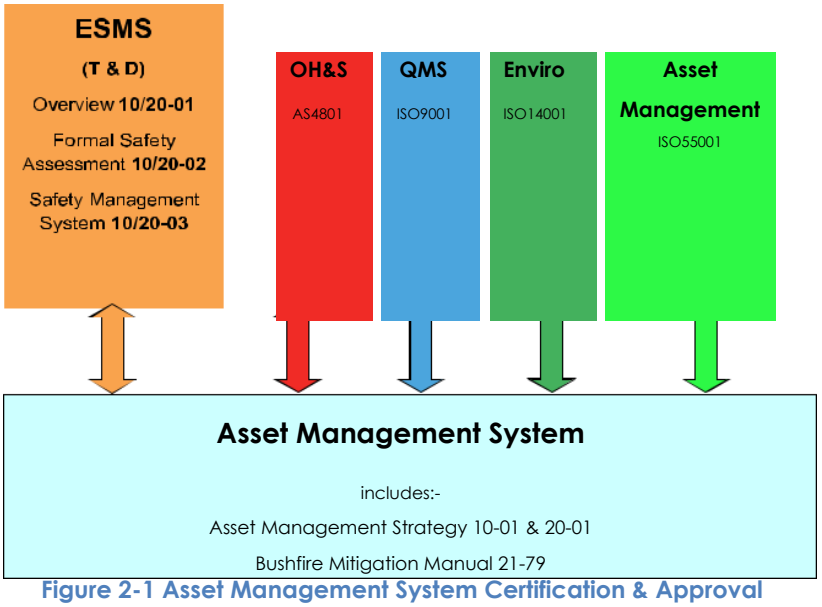

Figure 2-1 Asset Management System Certification & Approval

Compliance with relevant legislative obligations, the ESMS and the Plan is monitored by our Network Safety Management Committee. The Plan is subjected to annual internal and external review to provide an objective and robust framework for its continued development, including the adoption of emerging technologies and innovative ideas.

2.2 KEY OBJECTIVES

The key objectives of the Bushfire Mitigation Plan are to:

- Describe the strategies and programs implemented to mitigate the risk of fire ignition from supply network assets,
- Describe the processes and procedures for monitoring the implementation and effectiveness of the bushfire mitigation strategies and programs,
- Describe the corrective action processes and procedures for ensuring effectiveness of the bushfire mitigation program,
- Describe the processes and procedures that apply to operation and maintenance of the supply network during the fire season period and total fire ban and code red days,
- Nominate persons responsible for preparation and implementation of the Plan and their contact details,
- Provide contact details in the event of an emergency, *and*
- Demonstrate compliance with the *Electricity Safety (Bushfire Mitigation) Regulations 2023*. Appendix 1 provides a compliance matrix for this Plan.

Achievement of these objectives is supported through initiatives that include:

- Use of skilled people and technology to continue the development of safe distribution networks through:
  - o Underground distribution networks
  - o Increasing distribution feeder automation
  - o Enhanced protection and control
  - o Asset condition monitoring and replacement programs
- Consultation with municipalities, landowners and other affected persons to ensure the planting of appropriate trees near powerlines and relocation of powerlines where appropriate

3 POLICY

3.1 BUSHFIRE MITIGATION

AusNet Services policy is to implement a bushfire mitigation management strategy that complies with legislative requirements and creates a harmonious balance for community safety, preservation of the environment and cost effectiveness.

We aim to:

- Minimise the risk of fire ignitions by AusNet Services' distribution network assets that could become a wildfire and threaten public safety and property;
- Meet the requirements of the Act, Regulations and Code;
- Regularly review and develop management programs, processes, practices, methods and implement efficiencies for the benefit of customers and other stakeholders;
- Minimise the frequency and length of disruptions to the general public;
- Be committed to the safety of the community, as a whole, and employees engaged in the provision of the services;
- Preserve and enhance the environment; *and*
- Raise awareness of all aspects of bushfire mitigation through increased communication

3.2 ASSISTANCE PROVIDED TO FIRE CONTROL AUTHORITIES

AusNet Services' policy in respect to provision of assistance to Fire Control Authorities in their investigation of fires near supply networks is;

> *AusNet Services will provide assistance and advice to Fire Control Authority personnel to ensure that safe approach distances are maintained in accordance with the relevant 'Limits of Approach' contained within the 'Code of Practice on Electrical Safety for the Distribution Businesses in the Victorian Electricity Supply Industry' (the Green Book) for the purposes of their investigation of fire incidents near network assets.*
>
> *Assistance includes ensuring all un-safe electrical assets are made safe before the commencement of investigations and the provision of any reports relating to serious electrical incidents that AusNet Services are required to provide in accordance with the Electricity Safety (General) Regulations 2019.*

4. REFERENCES

- Asset Inspection Manual (30-4111)
- Asset Management Strategy (AMS 20-01)
- Bushfire Mitigation Manual (BFM 21-79)
- Distribution Business Electrical Safety Performance Reporting Guide (ESV)
- Electricity Distribution Code (Essential Services Commission)
- Electricity Safety Act 1998
- Electricity Safety (Bushfire Mitigation) Regulations 2023
- Electricity Safety Management Scheme (ESMS 10-03)
- Energy Networks Australia, Doc 017-2008, Industry Guideline for the Inspection, Assessment and Maintenance of Overhead Powerlines
- Energy Safe Victoria, Distribution Business Electrical Safety Performance Reporting Guide
- Enhanced Network Safety strategy (AMS 20-13)
- Powerline Bushfire Safety Taskforce, Final Report, 30 September 2011
- Power Line Bushfire Safety, Victorian Government Response to The Victorian Bushfires Royal Commission Recommendations 27 and 32, December 2011
- Protection Setting Operation Guidelines on Total Fire Ban and Code Red Days' (BFM 21-10)
- REFCL Program REFCL Systems Performance (REF 30-07-01)
- REFCL Demonstration of Required Capacity (REF 30-07-02)
- REFCL Certification Test Policy (REF 30-07-03)
- REFCL Annual Validation Test Strategy (REF 30-07-04)
- REFCL Network Configuration & Test Locations (REF 30-07-05)
- REFCL Test facilities (REF 30-07-06)
- Total Fire Ban Administration Manual' (D127)
- Vegetation Management Plan (BFM 10-05)

5 DEFINITIONS

Act	Electricity Safety Act 1998.
Code	Code of Practice for Electric Line Clearance prescribed for the purpose of Part 8 of the Electricity Safety Act and is Schedule 1 contained in the Electricity Safety (Electric Line Clearance) Regulations 2020.
Codified Area	Area defined in the Electricity Safety (Bushfire Mitigation) Regulations as an 'Electric Line Construction Area'. These are prescribed geographical areas of highest fire loss consequence where replacement or construction of powerlines must be with insulated cable.
Covered conductor	Conductor surrounded by a covering able to withstand accidental or temporary phase to phase or phase to earth contact. Covered conductor also includes Spacer Cable.
EDPR	Electricity Distribution Price Review. Involves Distribution Businesses submitting their plans every five years for managing the networks to the Australian Energy Regulator for approval of revenue streams through customer network charges.
ESV	Energy Safe Victoria which is the technical regulator in Victoria.
ESMS	Electricity Safety Management Scheme as required under the Electricity Safety Act 1998 and Electricity Safety (Management) Regulations 2009 for the provision of an asset management system to safely design, construct, operate, maintain and de-commission supply networks.
Extreme HBRA	The area defined by the fire loss consequence modelling determined by the Fire Services Commissioner.
Fire Behaviour Index (FBI)	The FBI provides a numerical scale of potential fire danger (should a fire start) based on the predicted rate of fire spread.
Fire danger period	Means a period declared under the Country Fire Authority Act 1958.
HBRA	Hazardous bushfire risk area as defined under Section 80 of the Electricity Safety Act. (Note; These are defined as 'at risk' assets for 'specified operators' only under section 83A of the Act.)
Inspection	Visual inspection of the above ground components of overhead electric lines which may be undertaken through either ground based or aerial inspection programs in accordance with the Asset Inspection Manual 30-4111.
Inspection & test	Ground based visual inspection program that includes intrusive test and treatment of timber poles in accordance with the Asset Inspection Manual 30-4111.
Regulations	Electricity Safety (Bushfire Mitigation) Regulations 2023 Electricity Safety (Electric Line Clearance) Regulations 2020
SAMS	Spatial Analysis Management System.
Supply networks	A network consisting of electric lines, substations, circuits and any other thing required for the purposes of the transmission, distribution or supply of electricity; transmission company has the same meaning as in the Electricity Industry Act 2000.
SWER	Single Wire Earth Return – A high voltage distribution network operating at 12.7kV.

6 GEOGRAPHIC AREA OF RESPONSIBILITY

The electricity distribution network area within Eastern Victoria as detailed within our Spatial Analysis Management System (SAMS) is shown below.

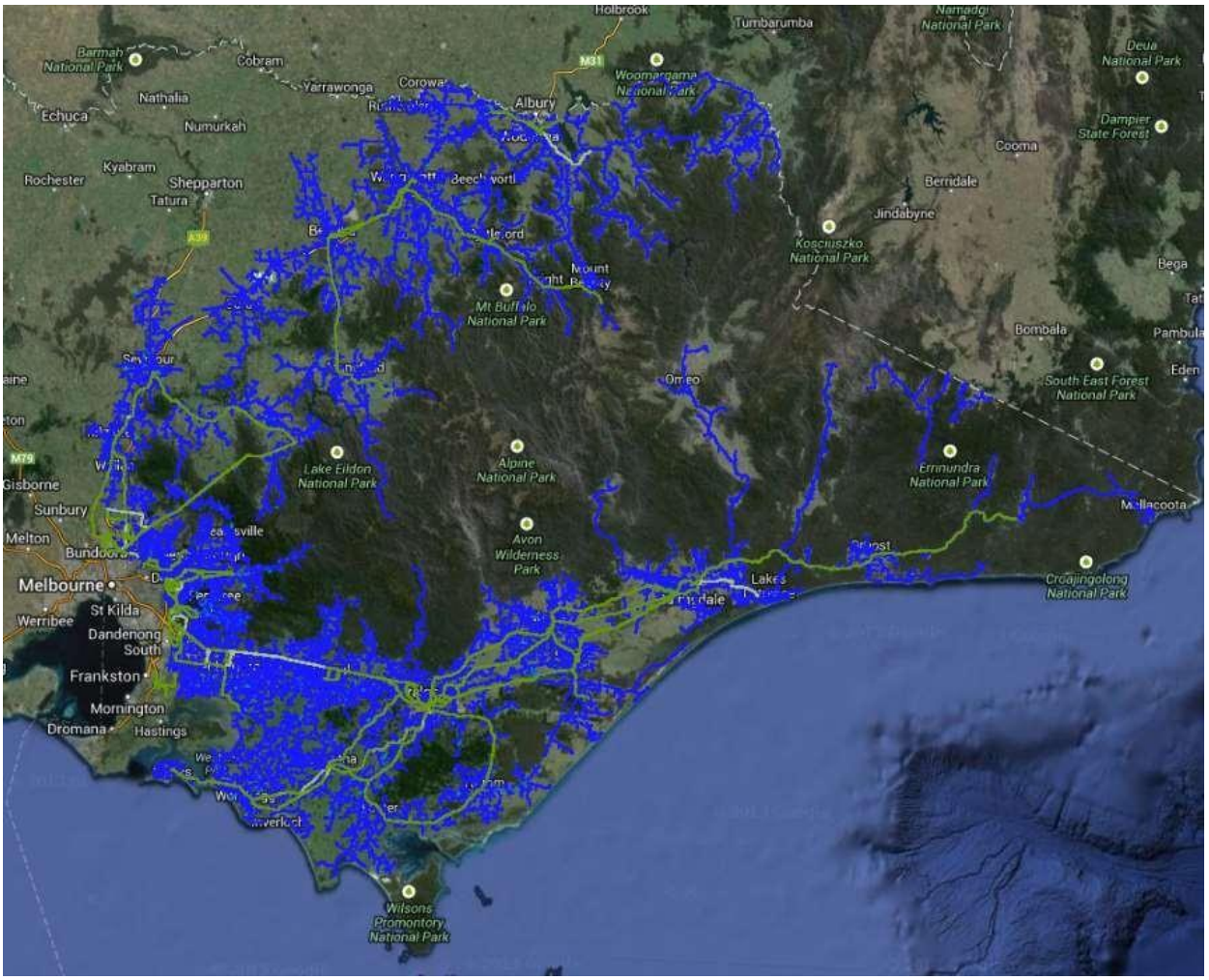

Figure 6-1 AusNet Services Sub-transmission & 22kV Distribution network

A typical download from SAMS is included in Appendix 2.

7 CONTACTS

Major Electricity Company

AusNet Services

Contact Details

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Tel: 9695 6000

Person Responsible for Plan Preparation

Hawaii Ho

Contact Details

Bushfire Mitigation Manager

Level 31, 2 Southbank Boulevard,
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Person Responsible for Carrying Out Plan

Andrew Linnie

Contact Details

Executive General Manager, Distribution

Level 31, 2 Southbank Boulevard,
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Emergency Contact

Customer & Energy Operations
Team 131 799 (24 hours)

Bushfire Mitigation Plan

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Southbank
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excluding public holidays

AusNet Services Website
https://www.ausnetservices.com.au/about
/network-regulation/regulatory-publications

Table 7-1 AusNet Services Contact List

8 PREVENTATIVE STRATEGIES

8.1 SUMMARY

AusNet Services' ESMS applies a full life cycle asset management philosophy for the management of its electricity networks. This management philosophy supports a continuous improvement approach toward the development and maintenance of preventative strategies designed to mitigate bushfire risk. These strategies are separated into three broad programs.

The first program contains activities associated with general asset maintenance and replacement. The processes and procedures supporting this program are contained within AusNet Services' Bushfire Mitigation Manual *(BFM 21-79)*.

The second program of preventative strategies is derived through analysis of asset condition and performance monitoring. This process identifies cost effective preventative strategies that complement the general maintenance program and are described in AusNet Services' Enhanced Network Safety Strategy *(AMS 20-13)*.

8.1.1 2009 VICTORIAN BUSHFIRES ROYAL COMMISSION RECOMMENDATIONS

The 2009 Victorian Bushfires Royal Commission (VBRC) provided a range of recommendations relating to distribution networks which are addressed within this Plan. Recommendations that required further investigation and analysis due to technical complexities were addressed by the Powerlines Bushfires Safety Taskforce (PBST) and their recommendations subsequently accepted by the Victorian Government. Recommendations 27, 28 & 29 are reflected through changes to the *Electricity Safety (Bushfire Mitigation) Regulations*. Appendix 3 contains a summary of the VBRC recommendations and reference within the Plan that describes implementation.

8.2 BUSHFIRE MITIGATION MANUAL

AusNet Services' Bushfire Mitigation Manual *(BFM 21-79)* contains the policies and procedures through which general cyclic asset maintenance & replacement programs are maintained. The objective of scheduled inspection and maintenance activities is to ensure the safe and reliable operation of electrical assets.

- Asset inspection program,
    - Scheduled pole inspections
    - Pole reinforcement or replacement
    - Pole top & conductor hardware maintenance

  - Low voltage spreader maintenance
  - Bird covers
  - Surge diverters
  - Expulsion Drop Out fuses
  - Private Overhead Electric Lines
- SWER earth testing & maintenance program,
- Vegetation management program,
  - Vegetation pruning and removal program
  - Private Overhead Electric Line clearance management

8.2.1 SCHEDULED POLE INSPECTIONS

A 2.5-year interval, cyclic inspection program, is maintained for AusNet supply network assets and three year interval for Private Overhead Electric Lines (POEL) located within hazardous bushfire risk areas (HBRA).

Cyclic inspection of poles within HBRAs is undertaken through the combination of ground (test & inspection) and aerial based inspection cycles, each set to 60-month intervals. These two inspection cycles are offset by 30 months to one another to ensure inspections are undertaken within AusNet's 30 month plus one month float interval. Poles unable to be inspected by aerial methods are scheduled for an additional ground based visual inspection.

Cyclic inspection of poles in areas other than hazardous bushfire risk are undertaken within the 61 month interval prescribed in the *Electricity Safety (Bushfire Mitigation) Regulations.*

Inspection schedules for poles are set within the asset data management system (SAP). Maintenance and/or replacement activities identified through the cyclic inspections are recorded within the asset management system. Criteria for assessment and prioritisation of asset maintenance are contained within the Asset Inspection Manual *(30-4111)*.

Assessment criteria for POELs are contained within the *Electricity Safety (Bushfire Mitigation) Regulations 2023.*

8.2.2 WOODSCAN® Survey

The WoodScan survey is a specialised assessment undertaken by an appropriately trained Asset Inspector or Technician to conduct a series of non-invasive tests to determine the amount of remaining sound wood of a degraded pole and its serviceability classification. WoodScan is applied to poles downgraded to 'Deteriorated' through the invasive testing (Dig & Drill).

WoodScan provides an objective assessment of the timber pole's residual strength, using acoustic-ultrasonic scanners in an array to identify the pole's section modulus at ground level. The bending-moment capacity of the pole at groundline is determined by the measured section modulus and residual fibre strength of the timber. From this bending-moment capacity, the tip strength is calculated by dividing it with the pole height above ground.

The priority at which an unserviceable timber pole is to be replaced is determined using business rules set by AusNet based on the ratio of the actual tip load supported by the pole and its residual strength.

More information about WoodScan®, including the required data to be measured/captured, milestones, training requirements and competency of technicians, monitoring of performance and the audit process is discussed in SOP 22-10: Asset Inspection – WoodScan.

8.2.3 POLE REINFORCEMENT OR REPLACEMENT

This preventative strategy requires the monitoring of pole condition to prevent pole failures. The primary risks are decay or white ant infestation of timber poles. This risk is addressed through a condition monitoring and treatment program for timber poles which includes an internal assessment of a timber poles' sound wood and application of timber preservative treatment. The combination of preservative treatment and the staking of timber poles assessed as suitable can safely extend the life of timber poles. Timber poles assessed as requiring replacement are recorded in the asset management system for replacement, with either timber or concrete poles.

A key asset replacement policy is the use of concrete poles for complex or key assets such as a pole type substation which provides protection against damage from bushfire events, white ants and rot.

8.2.4 POLE TOP & CONDUCTOR

This preventative strategy requires the condition monitoring through the cyclic inspection program of pole top hardware such as crossarms, insulators, conductor, conductor ties and connections. Failures of these asset types, in high bushfire risk areas, are identified as presenting a higher risk of bushfire ignition. Items identified for maintenance or replacement are recorded in the asset management system and scheduled for action according to business rules contained within the Bushfire Mitigation Manual.

A key asset replacement policy is the replacement of timber high voltage crossarms with steel which provide a significantly reduced risk of unplanned failure.

8.2.5 LOW VOLTAGE SPREADERS

A requirement of AusNet Services' Bushfire Mitigation Manual is the fitting of low voltage spreaders to open wire low voltage circuits located in areas designated as high bushfire risk areas. Spreaders reduce the risk of conductor clashing during severe winds or external contact with low voltage conductors. The clashing of low voltage conductors have been identified as presenting a higher risk of bushfire ignition. A requirement of the inspection program is to ensure compliance to the preventative strategy.

The long term preventative strategy is for the progressive removal of low voltage open wire in high bushfire risk areas. This will be achieved through application of AusNet Services' current design standard for new low voltage circuits in high bushfire risk areas which requires construction with either aerial bundled cable or underground. Current design standards are applied where major asset replacement or augmentation is required.

8.2.6 BIRD COVERS

The former State Electricity Commission of Victoria identified a higher risk of bird flashovers on concrete intermediate poles fitted with five and six shed post form insulators. Bird and animal flashovers were identified as a bushfire ignition risk. Accordingly, a subsequent retro-fit preventative strategy was deployed that required the fitting of bird covers to prevent insulator

flashover caused by birds and animals. The asset inspection program monitors and ensures compliance to this strategy is maintained.

The long term preventative strategy is for the application of a 'stretch' post insulator, which provides an increased clearance distance. This is reflected in current design standards for new assets.

8.2.7 SURGE DIVERTERS

A surge diverter is a device designed to protect electrical apparatus from transient over voltages, such as lightning, by providing a path to earth for the impulse current. Since the 1980s, monitoring of performance has identified makes and types that present higher risk of bushfire ignition following certain modes of failure. A preventative strategy of identifying and replacing those with higher risk of bushfire ignition is maintained through the cyclic asset inspection program.

8.2.8 EXPULSION DROP OUT FUSES

An expulsion drop out (EDO) fuse is a high voltage overcurrent protection device used to protect sections of overhead powerline and pole type distribution substations. The cyclic inspection program monitors the condition of these devices to identify cracked porcelain, corrosion or misaligned fuse mounts.

8.2.9 PRIVATE OVERHEAD ELECTRIC LINES

The inspection program for POELs includes assessment against the criteria contained in the *Electricity Safety (Bushfire Mitigation) Regulations*. Failure of POELs in high bushfire risk areas has been identified as a bushfire ignition risk. The Bushfire Mitigation Manual includes the procedures for customer notification of impending inspection and the issue and management of any defects identified through the inspection. The Manual also includes procedures for the notification and disconnection of POELs with urgent defects on Total Fire Ban days.

8.2.10 SWER EARTH TESTING & MAINTENANCE

A sample based testing plan, in accordance with AS 2490 – 1997, is applied to distribution network earths annually and the results assessed by the Line Assets department to determine corrective actions and future sampling rates. Results from sample based testing for SWER earths has required the adoption of 100% testing which is scheduled within the asset data management system (SAP) with a 10 year inspection and test interval. Earths found above the required specification limits are maintained or replaced.

8.2.11 VEGETATION MANAGEMENT

Vegetation clearances adjacent to overhead powerlines are managed in accordance with the *Electricity Safety (Electric Line Clearance) Regulations*. Failure to maintain clearance spaces to overhead powerlines provides an increased risk of bushfire ignition through conductor clashing or ignition of vegetation in direct contact with powerlines.

The Vegetation Management Plan *(BFM 10-05)* is provided annually to Energy Safe Victoria for acceptance. The Plan includes procedures for the cyclic inspection, customer notification and consultation and the pruning and removal of vegetation to maintain the prescribed clearance spaces.

8.2.11.1. VEGETATION PRUNING AND REMOVAL

The Vegetation Management Plan contains procedures for the notification and consultation with customers and stakeholders prior to the commencement of identified pruning and removal works. This process involves the identification of:

- Habitat for endangered species,
- Significant or historical trees,
- Hazard trees. (Program included in Section 7.3, Enhanced Network Safety)

8.2.11.2. PRIVATE OVERHEAD ELECTRIC LINES

The Vegetation Management Plan contains procedures for the inspection and subsequent issue and management of POEL clearance defects to customers.

8.3 ENHANCED NETWORK SAFETY

The Enhanced Network Safety strategy *(AMS 20-13)* contains preventative strategies and programs that are additional to those undertaken through the general maintenance program. These strategies have been developed through asset performance monitoring to identify cost effective programs to mitigate bushfire risk to as low as reasonably practicable. These strategies include the following:

- Expulsion Drop Out (EDO) fuse replacement,
- Hazardous trees removal,
- Bird/animal proofing of complex HV structures,
- Cross-arm replacement,
- High voltage pin type insulator replacement,
- Conductor replacement,
- Neutral screened service replacement,
- Replacement of bare wire powerlines with insulated in highest fire consequence areas,
- Enhanced feeder protection & control,
    - SWER Automatic Circuit Reclosers
    - Rapid Earth Fault Current Limiter installation
- Total Fire Ban day protection scheme settings,
- Armour rods and vibration dampers,
- Overhead lines circuit clearances,
- High voltage Aerial Bundled Cable (ABC) replacement

A key to the optimisation of these programs is the application of the Fire Loss Consequence Model (FLCM), developed by the Government's Powerline Bushfire Safety Taskforce, in asset risk modelling. The FLCM provides detailed discrimination of potential consequences of a bushfire initiated from network assets which support the identification and prioritisation of network operation and maintenance activities that can mitigate the bushfire risk.

The following provides a brief description of the strategies contained in the Enhanced Network Safety strategy.

8.3.1 EXPULSION DROP OUT FUSE REPLACEMENT

The Asset Management Strategy for Medium Voltage Fused Switch Disconnectors (AMS 20-61) is to progressively replace EDO units with either boric acid or fault tamer fuse unit types. Boric acid and fault tamer fuse units have been identified as having performance characteristics superior to EDOs which have been identified as having an increased risk of fire ignition in the event of mal-operation. All current FSDs on rural overhead distribution networks present some risk of fire ignition through mal-operation. The transition prioritises fuse unit replacement in the highest fire loss consequence areas. Application of Energy Limiting Fuse (ELF) and EDO fuse links are used under planned maintenance works in low fire loss consequence areas and during unplanned (fault and emergency) works.

8.3.2 HAZARDOUS TREE REMOVAL

Whilst a significant majority of trees outside the clearance spaces prescribed by the *Electricity Safety (Electric Line Clearance) Regulations* have the potential to fall or shed limbs onto overhead powerlines, this does not automatically deem them a 'hazard'. The regulations seek to cost effectively manage these risks through the requirement for trees identified as 'likely' to fall onto overhead powerlines to be assessed by a qualified arborist to determine what, if any, action is required. Trees identified for action are included together with other trees considered unsuitable in AusNet Services' hazardous tree program described in its Vegetation Management Plan *(BFM 10-05)*. Based upon current detection rates, the hazard tree program addresses approximately 5,000 hazard trees per annum.

8.3.3 BIRD & ANIMAL PROOFING

This program is designed to reduce the risk of high voltage electrical flashovers caused by birds and animals through the retro-fitting of complex high voltage structures, such as pole type substations and switches, with increased levels of insulation. AusNet Services' design standards for the construction of new and replacement assets include increased levels of insulation that prevent high voltage electrical flashovers.

8.3.4 CROSSARM REPLACEMENT

The Asset Management Strategy for Crossarms (AMS 20-57) acknowledges failures are an identified bushfire risk. To address crossarm failure rates aerial inspection was introduced in 2010 to provide an enhanced level of asset condition monitoring. A subsequent review of crossarm assessment criteria has provided inspection personnel with greater ability to apply a calibrated condition assessment rating. Together with the established practice of steel crossarms being the standard for new and replacement high voltage crossarms, failure rates are declining.

8.3.5 HV PIN TYPE INSULATORS

The Asset Management Strategy for Insulators (AMS 20-66) was reviewed in 2015 and found the targeted replacement program undertaken during 2011-2015 has reduced failure rates to a level whereby future replacement will rely upon the crossarm replacement program to manage insulator failure rates and risk. Replacement of high voltage crossarms with steel requires replacement of pin type insulators with current standard insulators. Fires associated with pin type insulator failure are typically caused by pollution and subsequent tracking during damp weather conditions.

8.3.6 CONDUCTOR REPLACEMENT

The Asset Management Strategy for Conductor (AMS 20-52) recognises conductor failure presents a high risk of bushfire ignition. Performance monitoring and analysis of conductor failures and condition, together with application of the government's Fire Loss Consequence Model are key attributes that are used to identify and prioritise sections of conductor for replacement. From this, increased volumes of conductor have been identified for replacement over and above that identified from the asset inspection program. This process has resulted in the development of enhanced conductor condition assessment criteria that is now used as part of the general maintenance program.

Amendments to the *Electricity Safety (Bushfire Mitigation) Regulations 2013* introduced 1 May 2016 require any planned conductor replacement (1kV to 22kV) of four or more consecutive spans to be constructed with insulated or covered conductor within codified areas. The Electricity Safety Act 1998 was subsequently amended in 2017 concerning this obligation.

At the time of 1 May 2016, the codified areas had approximately 1,680km of bare wire, medium voltage powerlines. This consisted of approximately 670km of SWER, 650km three phase and 360km of single phase powerlines.

Acceptance by the Government, in December 2011, of recommendations by the Powerline Bushfire Safety Taskforce, included the establishment of a $200M Powerline Replacement Fund (PRF). Administration of this fund is undertaken by the Government's Powerline Bushfire Safety Program (PBSP) department which is selecting and allocating funds to distribution businesses for the replacement of powerlines in the highest fire loss consequence (Electric Line Construction/Codified[1]) areas across the state over a ten year period.

Replacement of powerlines in AusNet Services' codified areas under the PRF commenced in 2014 and concluded in 2020.

AusNet Services will progressively replace remaining bare wire powerlines in codified areas through network replacement or relocation activities as described in Section 8.3.7 'Electric Line Construction (Codified) Areas'.

8.3.7 ELECTRIC LINE CONSTRUCTION (CODIFIED) AREAS

Construction of medium voltage powerlines with insulated cables or covered conductors provide a reduced risk of electrical flashover and arcing in the event of inadvertent contact. However, the cost of these construction methods are significantly greater than bare wire construction and are therefore considered for targeted application within codified areas.

AusNet Services' design and construction manuals contain approved standards[1] and drawings for accepted insulated cable and covered conductor construction. Design principles seek to achieve the least cost, technically acceptable options.

The following is a description of insulated and covered construction methods accepted within codified areas for AusNet Services' distribution network lines operating at nominal voltages between 1kV and 22kV. High voltage Fault Tamers are the standard within codified areas for each of the construction methods, except Underground, listed below;

Spacer Cable

Spacer cable, consisting typically of three phases, is held in a number of insulated cradles that are supported by a catenary wire strung between supporting poles or tower structures. Standard design for associated line equipment includes insulated and covered leads for transformers, automatic circuit reclosers, surge arrestors, HV fuses and gas insulated switches.

Covered Conductor

Covered conductor with Extruded Semi Conductive Layer and Cross Linked Polyethylene Insulation CCSX, that may be constructed in one, two or three phase configuration in a manner similar to bare wire construction. The basic difference between this and Spacer Cable is that the covered conductor used in Spacer configuration is not under tension as it is supported by insulated cradles. Standard design for associated line equipment includes insulated and covered leads for transformers, automatic circuit reclosers, surge arrestors, HV fuses and gas insulated switches. AusNet Services will advise Energy Safe Victoria of any new covered conductor technology proposed for network application.

Aerial Bundled Cable (ABC)

ABC consists of three insulated, metallic screened cables wound around a bare catenary wire. The catenary wire, similar to covered conductor, provides the tensile strength and support for stringing ABC between pole or tower supporting structures.

Standard design for associated line equipment includes insulated and covered leads for transformers, automatic circuit reclosers, surge arrestors, HV fuses and gas insulated switches.

Hybrid Underground

Underground cable used to between above ground structures such as pole type substations, gas insulated switches, automatic circuit reclosers and HV section fuses.

The above ground assets, similar to covered conductor and ABC, includes insulated and covered leads for transformers, automatic circuit reclosers, surge arrestors, HV fuses and gas insulated switches.

Underground (cost effective for medium density development)

[1] Standard Installations Manual 30-4142

Similar to hybrid underground with the exception that associated equipment such as substations, switches and fusing are contained within ground mounted, insulated enclosures. Interfaces with an overhead network have insulated or covered leads to surge arrestors.

For both underground and hybrid networks, should an isolating transformer for isolation of a section of feeder from Rapid Earth Fault Current Limiter (REFCL) protection be installed at the interface, insulated and covered leads are fitted to the transformer, surge arrestors and HV fuses.

The locations of medium voltage lines specified within the regulations are defined as those lines being within an "*electric line construction area*" (codified area). The codified areas within AusNet Services' franchise area are illustrated in figure 8.1 (red colour shaded areas).

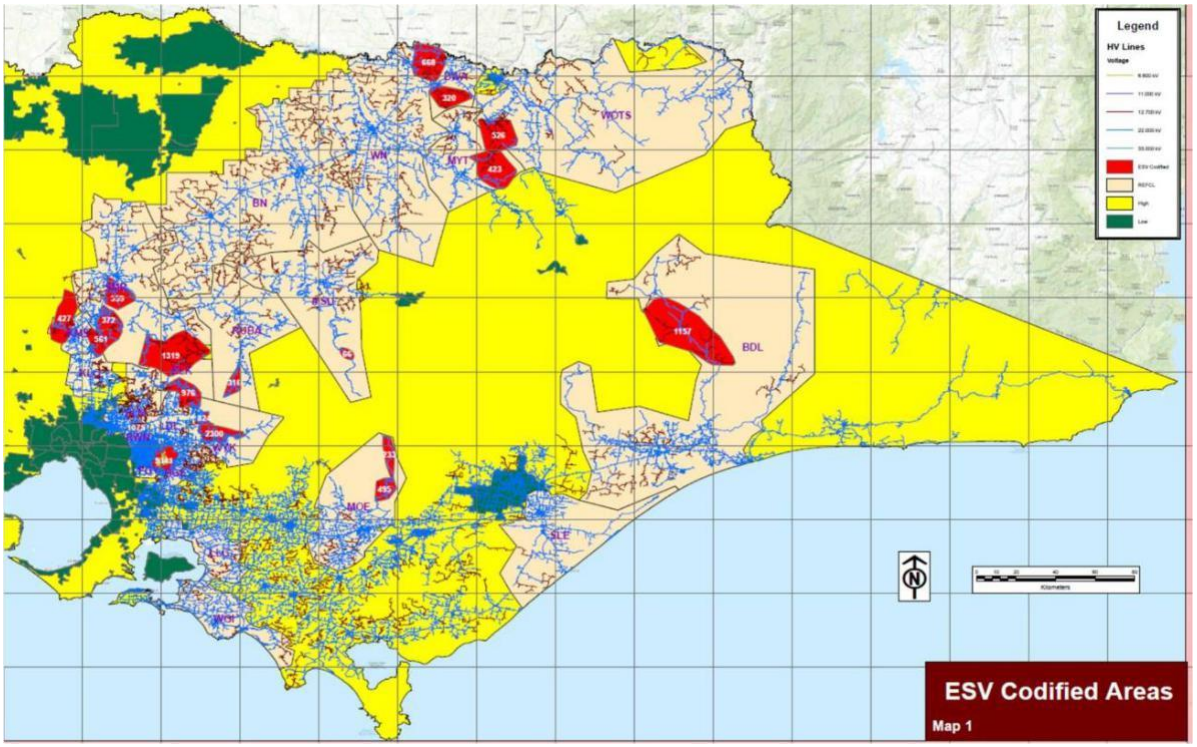


Figure 8-1 Electric Line Construction (Codified) Areas

Application of insulated or covered conductor construction standards within codified areas applies to the following network construction, replacement and relocation activities associated with medium voltage (1kV-22kV) electric lines.

With respect to replacement and relocation activities the regulations specify;

> "*planned replacement or relocation of an electric line that involves—*
> *(a) the relocation of at least 4 consecutive spans of the electric line; or*
> *(b) the replacement of conductors on at least 4 consecutive spans of the electric line.*"

The following replacement and relocation activities and timing are considered '*planned*';

Replacement ≥4 consecutive spans due to;

- Risk based – replacement based upon asset condition and criticality
- Condition based – replacement based upon inspection program
- Load growth – replacement with increased conductor size to meet load growth

Relocation ≥4 consecutive spans due to;

- Line relocation – customer or company initiated electric line relocation

Construction of any new medium voltage electric line that is part of the supply network must be constructed with insulated cable or covered conductor.

Replacement activities exempt from insulated cable or covered conductor construction within codified areas include;

- Fault and Emergency works as these works are not considered '*planned*'.

    - Where required planning and design timeframes can be achieved, due to deferral of supply restoration requirements, replacement of medium voltage assets will be undertaken to insulated or covered conductor standards.

Reporting to Energy Safe Victoria is provided in accordance with their template which has identified the total route length of bare medium voltage lines in codified areas as at 1 May each year since 2016 and the progressive replacement and the drivers for replacement.

8.3.8 NEUTRAL SCREENED SERVICE CABLES

The Asset Management Strategy for Service cables (AMS 20-76) recognises service cable failures present a risk of bushfire ignition. Performance monitoring and analysis has identified neutral screened service cables as those with the highest rates of failure. A replacement program includes a combination of scheduled replacement and targeted replacement which utilises Advanced Metering Infrastructure (AMI) data and analysis to identify service cables with emerging defects. The replacement program is supported by maintenance procedures that require the replacement of neutral screened service cables in the event of any service faults or pole replacements with neutral screened services attached.

8.3.9 ENHANCED FEEDER CONTROL & PROTECTION

AusNet Services has developed and implemented protection and reclose settings for all protection devices supplying the high fire loss consequence areas.

The strategic direction established by AusNet Services has been reinforced by the Powerline Bushfire Safety Taskforce's[2] (PBST) Final Report and the Government's response[3] which recommended application of protection settings on Total Fire Ban and Code Red Days, The protection settings sought to apply the more sensitive settings to approximately 20% of rural powerlines that represented approximately 80% of the 'worst' fire loss consequence with the 'remaining' areas representing approximately 80% of rural powerlines.

In 2020 ESV's Powerline Bushfire Safety Committee recommended a review of protection settings in the highest consequence (worst) areas. A VESI working group was established and a model developed to assess overall benefits gained through implementation of 'one fast protection operation' on Total Fire Ban days, like Code Red days, in the highest consequence areas. This review recommended the adoption of 'one fast protection operation' and was subsequently implemented following endorsement by AusNet Services' Network Safety Management Committee in November 2020. The protection sequences are shown in Figure 8-2.

Area	Total Fire Ban day	Code Red day
Rural powerlines in the worst areas.	One fast protection operation	One fast protection operation
Rural powerlines in remaining areas	One fast and one slow protection operation	One fast and one slow protection operation.

Figure 8-2 PBST Recommendation 2

8.3.9.1. AUTOMATIC CIRCUIT RECLOSERS

AusNet Services has developed and implemented protection and reclose settings for all existing SWER, three-phase reclosers and circuit breakers for networks supplying high fire loss consequence areas.

AusNet Services completed the replacement in December 2015 of all SWER Oil Circuit Reclosers (OCRs) with remote controlled Automatic Circuit Reclosers (ACRs) to facilitate compliance with recommendation 32 of the 2009 Victorian Bushfires Royal Commission. AusNet Services' design standard for protection of SWER systems requires the application of remote controllable ACRs.

ACRs and circuit breakers offer remote controlled capability to modify electrical protection sequence settings that are applied in accordance with declared fire hazard ratings such as Total Fire Ban and Code Red days. Protection sequence settings are applied in accordance with section 8.3.9 "Enhanced Feeder Control & Protection'.

8.3.9.2. FEEDER PROTECTION & CONTROL

Consistent with the protection and control objectives discussed above for ACRs, the replacement of relays and re-programming of additional relays on 22kV distribution feeders within zone substations has been undertaken to provide an integrated distribution feeder protection and

[2] The PBST was formed to outwork complex technical aspects of the 2009 Bushfires Royal Commission recommendations

[3] Victorian Government Response to The Victorian Bushfires Royal Commission Recommendations 27 and 32, December 2011

control framework. The framework provides programmable flexibility to achieve the prescribed functionality required for Total Fire Ban and Code Red days.

8.3.9.3. RAPID EARTH FAULT CURRENT LIMITER IMPLEMENTATION

Consistent with amendments to the *Electricity Safety (Bushfire Mitigation) Regulations 2013* introduced on 1 May 2016, AusNet Services is implementing REFCL technology in 22 nominated zone substations by 1 May 2023. The electrical protection technology is designed to minimise the fault current (energy) dissipated from phase to earth (wire to ground) faults on the 22kV network in order to reduce the risk of fire ignition associated with network incidents.

Implementation and testing by government of two different types of REFCL technology was completed at Kilmore South zone substation on a limited 40km section of network in 2014. These tests were subsequently used to inform the development of regulatory performance specifications (‘*required capacity’*[4]) which are prescribed within the regulations. REFCL technology operating at the required capacity will minimise the risk of fire ignition associated with phase to ground faults on days of heightened fire danger such as those experienced on Ash Wednesday and Black Saturday.

Based upon a sample period of network fault data, analysis undertaken by the Government and CSIRO predict network fire related incidents associated with the nominated zone substations can be reduced by between 50-55%.

A REFCL operates when a single phase-to-earth fault occurs. Its operation causes the phase voltage of the faulted phase to be reduced to near earth potential (zero volts), thereby working to eliminate the flow of fault current. To achieve this, the REFCL is tuned to the capacitance of the electrical network. This *compensation* results in phase to ground voltage on the faulted phase reducing to near 0 volts whilst the healthy phases rise from 12.7kV up to 22kV (potentially to 24.2kV i.e. 22kV plus 10 per cent).

Whilst the REFCL is compensating for a fault, the healthy phases remain energised and customers remain on supply. However, there remains a risk that the energised phases may be in an unsafe condition depending upon what the nature of the network fault is. Accordingly, a compensating period of up to 20 seconds has been determined which may be varied subject to a detailed risk assessment.

The REFCL ‘required capacity’ places the network electrical protection at an enhanced level of sensitivity and speed of operation which will interrupt the affected feeder after a predetermined period of compensation. The speed and sensitivity means that traditional protection devices distributed along a feeder will not operate as they currently do, to detect and isolate a faulted section of the network. This results in greater numbers of customers having their electricity supply interrupted.

The potential impact on network reliability necessitates a balanced approach toward the application of REFCL technology. Accordingly, AusNet Services operates REFCLs at the ‘*required*

[4] Required capacity is defined within the *Electricity Safety (Bushfire Mitigation) Regulations*. This provides the protection sensitivity required to minimise the risk of fire ignition due to a phase to ground fault.

capacity' specifically on days of heightened bushfire risk (Total Fire Ban & Code Red days). Application of heightened fire risk settings and operation are discussed in section 11.2.4 'REFCL Protection Settings'.

Operation of REFCLs outside heightened bushfire risk periods are at settings that are less sensitive than the 'required capacity'. Should a REFCL detect a permanent low impedance phase to ground fault during these periods it will compensate for up to 20 seconds and will either trip the faulted feeder or utilise traditional network protection schemes to detect and isolate the fault.

AusNet Services is implementing REFCL technology at the 22 zone substations prescribed in Schedule 2 of the regulations through three tranches of work. Figure 8-3 shows the location and planned commissioning dates of the REFCL technology, by zone substation, in each of the three tranches. Extensions of time to the original compliance deadlines for a number of zone substations have been granted by ESV as a result of High Voltage customer REFCL-readiness delays and/or network characteristics on a number of feeders preventing compliance with the '*required capacity*' performance criteria from being demonstrated.

The installation program includes all works required to achieve the required performance criteria while also ensuring that network safety, reliability and compliance with our obligations under various industry codes, including the Victorian Electricity Distribution Code, are not compromised. The works consist of, but may not be limited to, all necessary substation works, and works on the feeders, such as network balancing, line hardening, replacing incompatible equipment and addressing increased HV customer connection point voltage levels.

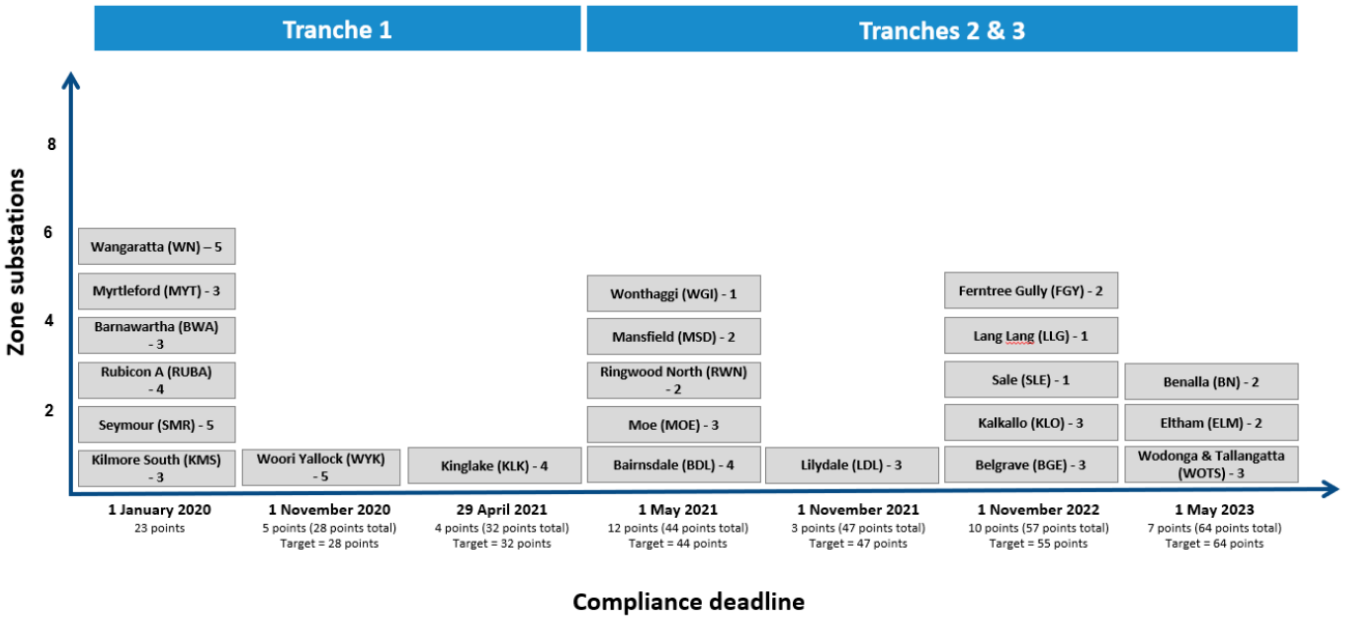


Figure 8-3 REFCL Location and Timing of Implementation

8.3.9.4. REFCL EXEMPTED NETWORKS & TIME EXTENSIONS

In accordance with the Order In Council (OIC), G39 issued 1 October 2020 and Energy Safe Victoria's general exemption issued 12 October 2020, hybrid and underground networks within

REFCL protected areas are exempt from the requirement to meet 'required capacity' REFCL protection requirements.

The ability to achieve and maintain 'required capacity' on REFCL protected networks can be significantly compromised by the capacitive effects of insulated networks. As hybrid and underground networks are estimated to reduce the risk of fire ignition by approximately 99%[5], the opportunity to isolate these sections of network from REFCL protected networks provides an ability to cost effectively achieve 'required capacity' for the remaining sections of REFCL protected networks.

Appendix 5 provides a list of hybrid and underground networks that have been isolated from REFCL protected networks. A description of hybrid and underground networks is provided in section 8.3.7.

Also included in Appendix 5 is a list of the time extensions granted by Energy Safe Victoria to meet legislated performance standards.

8.3.10 TOTAL FIRE BAN DAY ACR PROTECTION SETTINGS

Application of protection sequences are applied on Total Fire Ban and Code Red days in accordance with the table illustrated in figure 8-2. The process for application of protection sequences on high fire danger days is discussed in section 11.2.3 'Auto Reclose Suppression & Protection Setting Changes'.

The AN140 Fire Loss Consequence Model (FLCM)[6] has been used to identify, within hazardous bushfire risk areas (HBRAs), those areas as having the highest consequence ('worst areas' per figure 8-2). The balance of HBRAs are regarded as the 'remaining areas' per table 8-2.

This model is recognised as representing the worst of the worst fire conditions and is based upon Ash Wednesday weather conditions, Fire Danger Index 140 and full ground fuel conditions. The designated 'worst' and 'remaining areas' do not change annually as happens under FLCMs that take into account annual ground fuel reduction. Endorsement of this model by the Network Safety Management Committee (NSMC) was received following presentation of an options paper[7] to the October 2016 meeting.

A list of the devices and their respective protection sequences has been provided to Energy Safe Victoria. An updated list is provided where alteration to the designated 'worst' and 'remaining' areas occur.

8.3.11 ARMOUR RODS & VIBRATION DAMPERS

A retro-fitting program has been developed and implemented for the installation of conductor vibration dampers, which in accordance with industry standards, requires the fitting of armour

[5] CSIRO Risk Reduction Model

6 2014/15 version

7Review of Protection Settings Regime on TFB Days', 19 October 2016

rods. Application of armour rods and vibration dampers had been completed by 1 November 2020 in accordance with the Plan approved by ESV.

8.3.12 OVERHEAD LINE CIRCUIT CLEARANCES

A program had been developed, implemented and completed to survey approximately 10,200 spans of overhead powerline by December 2015. The survey is targeted to poles carrying multiple circuits and will seek to confirm that clearances are being maintained in accordance with design standards. Adherence to design standards mitigates the risk of conductor clashing which may result in ground fire ignitions.

8.3.13 HIGH VOLTAGE AERIAL BUNDLED CABLE REPLACEMENT

Failure of non-metallic screened (NMS) high voltage aerial bundled cable (HV ABC) on the 22kV network is an identified bushfire risk. Performance monitoring and analysis of NMS HV ABC failures has been used to identify feeders with highest rates and risk of failures. These areas were concentrated in the Dandenong Ranges.

AusNet Services completed a program in March 2016 that replaced NMS HV ABC across the Dandenong Ranges (approx. 62km) with either underground cable or light duty metallic screened (LDMS) aerial bundled cable. The longer term strategy (2016-2023[8]) is to replace remaining 22kV NMS HV ABC across other sections of the network in conjunction with REFCL implementation and associated network hardening.

8.3.14 POWERLINE REPLACEMENT FUND

The Victorian Government, through the Powerline Bushfire Safety Program, is replacing bare wire powerlines in areas of highest bushfire consequence. The program's 'Powerline Replacement Fund' makes available up to $200 million funding bare wire powerline replacement over a 10 year period within Victoria. Priority is being given to replacing powerlines that:

1. are part of a rural or regional electricity network;
2. are located in the areas of highest fire loss consequence;
3. support the State's emergency management priorities; *and*
4. are cost effective and support the State in maximising the reach of the investment.

The funds are being allocated to Distribution Businesses and owners of bare wire private overhead electric lines (POEL), who are required to coordinate replacement planning and works, including engaging contractors, securing product supplies and obtaining local planning approvals.

8 Refer letter to ESV dated 30 Nov 2017 'BFM Programs Update' (…/ESV/Correspondence/BFM Programs)

8.4 RESEARCH & DEVELOPMENT

Research and development has resulted in the implementation of new generation protection and control technology for SWER networks. Continued research and development of cost effective measures to mitigate bushfire risk in Victoria include the following key initiatives:

- Development and implementation of Rapid Earth Fault Current Limiters,
- Insulated cable technologies,
- Network data monitoring and analysis

8.4.1 RAPID EARTH FAULT CURRENT LIMITERS

The advent of modern power electronics has revolutionised the performance of the classical Petersen Coil (ground fault neutraliser) by enabling it to dynamically monitor the residual currents flowing and thereby compensate to achieve near zero current flow. More recently, New Zealand distribution companies have been utilising this technology to improve supply reliability and quality.

A Victorian Electricity Supply Industry (VESI) REFCL technical working group, including Energy Safe Victoria, has been established to facilitate the sharing of learnings through the continued development and deployment of REFCLs by respective distribution businesses.

Implementation of tranche 1 identified the following issues that are impacting the implementation of REFCL technology;

- Research and development
  - Network harmonics,
  - Network damping
- Ground Fault Neutraliser (REFCL) hardware and firmware upgrades to deliver compliance functionality and operational reliability,
- High voltage customer compliance/readiness for REFCL networks.

Subsequent to further research and development with other REFCL service providers, AusNet Services commissioned and demonstrated '*required capacity*' with a second REFCL technology at the Kinglake zone substation in 2021. The objective of the second REFCL supplier is to reduce the risk of the business being reliant on a single technology supplier.

8.4.2 INSULATED & COVERED CABLE TECHNOLOGIES

During 2012, AusNet Services initiated trials of insulated cable technologies applied in other distribution networks to ascertain their cost effectiveness, relative to existing cable standards used in the Victorian electricity supply industry, in mitigating bushfire risk. Aspects critical to the cost

effectiveness of other cable technologies will be their ability to replace existing bare conductor with minimal reconstruction of existing pole structures and their insulation capabilities and compliance to requirements of the Electricity Safety (Electric Lines Clearance) Regulations.

In 2016, AusNet Services added spacer cable and hybrid[9] underground to its design standards. Additional new covered conductor products are being trialled and will be utilised if found to be cost effective.

8.4.3 NETWORK DATA MONITORING AND ANALYSIS

AusNet Services has successfully undertaken proof of concept trials using real time network data to identify potential network faults. Two key sources of data being analysed are;

- Advanced Metering Infrastructure (AMI) data, *and*
- Feeder protection relay data

In both cases, the trials involve the application of data algorithms that establish dynamic operating parameters for the sections of the network being monitored under 'normal' operating conditions. The algorithms seek to identify, under real time conditions, operating conditions that are outside the defined 'normal' operating conditions.

8.4.3.1. LOW VOLTAGE NETWORK FAULTS

Following trials that demonstrated the capability to identify defective low voltage neutral connections, implementation of this type of network monitoring through the control room has contributed to a significant reduction in reported neutral failures.

On-going development of AMI data analysis is seeking opportunities to identify conductor failures and network load forecasting at distribution substation level.

8.4.3.2. HIGH VOLTAGE NETWORK

Establishing normal operating parameters of the high voltage network has undergone proof of concept testing that has confirmed an ability to detect abnormalities on the high voltage network that have resulted in permanent faults. On-going development is seeking to test the ability of this initiative to identify potential faults on the multiphase and SWER sections of the high voltage distribution networks together with establishing levels of accuracy.

[9]Underground HV with key structures such as switches and substations remaining overhead

9. LIST OF WORKS

9.1 GENERAL MAINTENANCE PROGRAM

The general line maintenance program of preventative strategies to address network safety and bushfire risk is generated through scheduled cyclic condition based asset inspection and vegetation assessment programs. The works identified from the inspection and assessment programs are assigned a time based prioritisation within which the identified works should be scheduled for action.

The scheduled maintenance works which are critical to mitigate bushfire risk within HBRAs are monitored through exceptions reported by the Bushfire Mitigation Index (BMI). The target during the declared fire season is for all works to be completed within the respective time based prioritisation schedule. Completion of scheduled works within the prioritised dates ensures the BMI produces a zero index. A zero index means that no works critical to bushfire mitigation are outstanding beyond their scheduled dates. The table below lists the activities monitored through the BMI and the required times for completion of works.

Fire Zone	Overhead Line Inspection	Timeframe (months)	Business Rule
HBRA incl. codified area	Cyclic pole	30	• All poles except Limited Life poles • Ground inspection at 60-month nominal interval • Aerial inspection at 60-month nominal interval • Aerial and Ground inspection cycles offset by 30 months to achieve a 2.5-year (plus one month float) inspection interval •
	Limited Life pole	30	Maximum 30 months plus one month float between inspections
	Private Overhead Electric Line (PEL) pole	37	Maximum 37 months between inspections
LBRA excl. codified area	Cyclic pole	61	• All poles except Limited Life poles • Maximum 61 months between inspections
	Limited Life pole	30	Maximum 30 months plus one month float between inspections
	Private Overhead Electric Line (PEL) pole	61	Maximum 61 months between inspections
Fire Zone	**VEGETATION MANAGEMENT**	**TIMEFRAME**	**BUSINESS RULE**
HBRA	Cyclic assessment & clearance	Annual	• Complete by the start of the Fire Season (declared Fire Danger Period) • During the Fire Season Code PT1& PT30 trees must be actioned within 24 hours and 30 days respectively
LBRA	Cyclic assessment & clearance	Annual	
Fire Zone	**BFM MAINTENANCE**	**TIMEFRAME (DAY)**	**BUSINESS RULE**
HBRA incl. codified areas	Unserviceable poles Attachments Conductors Surge Diverters Bird Covers	All priority codes	- All US poles actioned within 90 days ~~- All LL poles actioned within 30 months~~ - All PT30 attachments and unacceptable SD actioned within 30 days - All PT90 22kV bird covers and priority 66kV bird covers actioned within 90 days - All PT180 attachments, conductors and 22kV bird covers actioned within 180 days

Figure 9-1 General BFM maintenance – preventative strategies program

9.1.1 Asset Inspection Cycle Change & Transition Plan

Following Energy Safe Victoria's request made June 2023, AusNet increased the inspection frequency required by the Plan, effective 30 September 2023:

- Inspection interval of overhead line asset in hazardous bushfire risk area (HBRA) moves to 30 months(with additional one month float allowable); and
- Inspection interval of Limited Life poles in all areas moves from 37 months to 30 months(with additional one month float allowable) .

The corresponding inspection program transition plan is commencing 1 October 2023 to achieve the 30-month inspection interval for all overhead line assets in hazardous bushfire risk areas (HBRA) of AusNet's Distribution network by end of March 2027.

9.2 ENHANCED NETWORK SAFETY

The Enhanced Network Safety strategy *(AMS 20-13)* discussed in Section 8.3 summarises the range of asset plant and program strategies applied to reducing bushfire risk. The range of programs is optimised to provide a plan of works that are implemented and monitored through the Network Safety Management Committee[10] (NSMC). The plan of work programs and respective program volumes will vary according to network performance outcomes and program effectiveness and efficiency. The enhanced network safety program includes prescribed works derived from Directions issued by Energy Safe Victoria and from transition to compliance with changes in the regulations.

Directions issued by ESV include the requirement to develop programs requiring application of vibration control and checking of circuit clearances. The Directions required the development of Plans[11], specifying the scope and timing for implementation of the programs, which have been approved by ESV.

[10] NSMC discussed in Section 13.1 'Monitoring and Auditing'

[11] AMS 20-52-1 Vibration Dampers & Armour Rods Plan v4 and AMS 20-52-2 Conductor Spacers Plan v2

10 ASSET INSPECTION

10.1 INSPECTION PLAN

AusNet has approximately 210,000 poles in designated hazardous bushfire risk areas (HBRA), recorded in its asset management system (SAP). Inspection of these assets at AusNet's intervals of 30 months (plus one month float) is achieved through a combination of ground (test & inspection) based and an aerial based inspection cycles. A nominal 60-month inspection interval applies to each cycle with the respective cycles offset by 30 months to one another to provide an inspection interval of 30months plus one month float.

Cyclic inspection of poles in areas other than hazardous bushfire risk are undertaken within the 61 month interval prescribed in the *Electricity Safety (Bushfire Mitigation) Regulations.*

Planning and implementation for the inspection of these assets is co-ordinated through a single management group within AusNet Services and reported monthly to the Network Safety Management Committee (NSMC). A sample of the annual inspection plan is provided below.

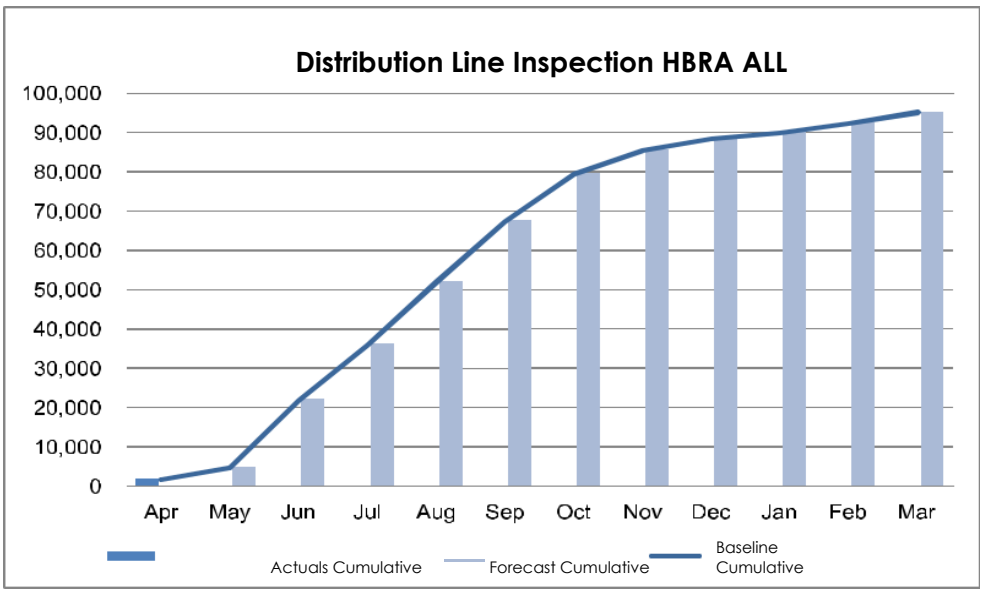


Figure 10-1 Typical Annual HBRA Inspection Plan

Management reporting from the asset data management system enables the forecasting of resources through provision of 'look ahead' reports that forecasts the due inspection dates of HBRA & LBRA poles.

10.2 INSPECTOR TRAINING

Asset inspection activities are undertaken predominantly by AusNet Services employees. The training course utilised by AusNet Services for asset inspection personnel (employee or contract) undertaking ground based inspection has been approved by Energy Safe Victoria as shown in Appendix 4. This approval also acknowledged the recognition of prior learning received by existing asset inspection personnel. AusNet Services' asset inspectors have received Certificate II Asset Inspection qualifications which are recorded in AusNet Services' training register. The Position Description for an Asset Inspector requires the incumbent to have Certificate II Asset Inspection qualification.

Asset inspection personnel engaged in the aerial inspection program are qualified linesman. These asset inspection personnel have been inducted and trained in AusNet Services' policies and procedures relating to this program. Energy Safe Victoria has approved the training course and requirements provided to these personnel as shown in Appendix 4.

The asset data management system (SAP) requires the recording of the identification of the asset inspector and audits are undertaken to ensure maintenance of inspection competency as described in Section 13.6 'Training'.

11 OPERATION & MAINTENANCE PLANS

In addition to Section 6.9 of AusNet Services' Electricity Safety Management Scheme *(ESMS 10-03)* 'Emergency Preparedness and Response', the following describes the operation and maintenance plans associated with AusNet Services' bushfire mitigation program.

11.1 FIRE EVENTS

11.1.1 INVESTIGATION & ANALYSIS

All network asset related fire events are investigated and reported to Energy Safe Victoria (ESV) in accordance with ESV's *'Distribution Business Electrical Safety Performance Reporting Guide'*. These events are recorded and analysis undertaken in order to identify network asset management strategies that may result in the mitigation of these events. The strategies listed under Section 8, 'Preventative Strategies', have been developed and implemented following analysis of fire incidents.

11.1.2 MANAGEMENT OF FIRE EVENTS

Fire events reported to AusNet Services by customers, personnel or fire control agencies are reported to Energy Safe Victoria (ESV) in accordance with ESV's *'Distribution Business Electrical Safety Performance Reporting Guide'*.

In the event of significant bushfires AusNet Services, together with other Distribution Businesses, has processes and procedures in place for a mutual aid program. Mutual aid programs are a requirement of the Distribution Code of Practice and these resources are managed and co-ordinated through AusNet Services' Integrated Response and Contingency System (SPIRACS).

A committee comprised of senior managers from the distribution companies oversee this process and an emergency response plan has been formulated. It includes a set of standard procedures, the nomination of key personnel, communication arrangements, other support agencies and contractor lists. In the event of a major incident and the implementation of the plan the committee would establish strategies as necessary for the:

- Coordination of the response and electricity supply recovery,
- Media releases,
- Dealings with government; *and*
- Any other matters considered appropriate.

The role of AusNet Services will be one of support to the combating agencies such as SES, CFA, FRV (MFB) and Victorian Police in matters relating to electricity supply.

If a disaster is declared by a Fire/Disaster Coordinator, and roadblocks erected, AusNet Services operational personnel authorised to switch the network must not enter into the restricted area. All operations must be performed external to the restricted area.

Arrangements may be agreed to between the Fire/Disaster Coordinator and the CEOT Manager to enable operations within the restricted area. This agreement must hold the safety of personnel paramount and personnel involved must be consulted and their agreement to the arrangements confirmed before entry is undertaken.

11.1.3 NETWORK CONTINGENCY PLANS & STRATEGIES

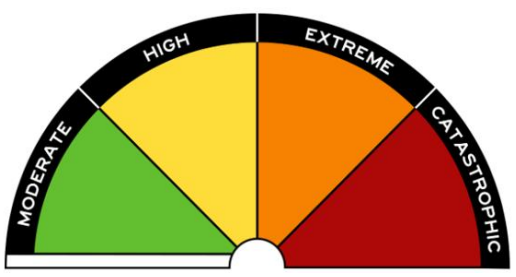
During previous fire events, AusNet Services' Emergency Management Teams have utilised a number of strategies and contingency plans to either prevent asset damage or provide resources for post fire recovery activities. These include the following:

- Fuel reduction around timber poles ahead of fire front,
- Application of fire retardant to timber poles ahead of fire front,
- Fire spotting of asset fires after fire front passes,
- Resource planning and staging which includes: labour, materials, generators

11.2 TOTAL FIRE BAN & CODE RED DAYS

Total Fire Ban and Code Red days reflect the Australian Fire Danger Ratings (AFDR) 'High', and above as shown below. The fire danger ratings indicate that should a fire start on a day with "High" and above FDR day, it 'may be uncontrollable', Days rated as 'Moderate' are regarded as 'most likely be controlled'.

AFDRS - Fire Danger Rating



Name/Colour	Fire Behaviour Index Range	Suppression difficulty
MODERATE (Green)	12-23	Most bushfires in this category. Fires typically suppressed with direct, parallel or indirect attack.
HIGH (Yellow)	24-49	Initial attack success critical to prevent large fire development. Defensive suppression strategies.
EXTREME (Orange)	50-99	Defensive suppression strategies. High levels of threat to life/property. Safety of firefighters and community paramount.
CATASTROPHIC (Red)	100+	Unsafe for firefighters and community. Without initial attack success, likelihood of very large fire development is very high. High probability of loss of life and property.

Prior to the declaration of the fire season AusNet Services will obtain annual fire permits from the FRV (MFB), CFA and DELWP enabling the use of fire in the open air on Total Fire Ban days/ during the Fire Danger Period. Copies of the permits are placed on the AusNet Services intranet site. Field managers will ensure that relevant personnel within their organisations, including contractors, are advised of the permits.

On Total Fire Ban days the following operations are applicable.

11.2.1 CUSTOMER & ENERGY OPERATIONS TEAM (CEOT) RESPONSIBILITY

Urgent Defective Private Lines

The CEOT (24 hour control room) will arrange the disconnection of any outstanding urgent defective Private Overhead Electric Lines (POELs). This will include:

- Arranging Field Crews to disconnect any urgent defective POELs;
- Contacting owners of urgent defective POELs to advise them of the disconnection; and
- Arranging Field Crews to reconnect any disconnected POELs when Total Fire Ban has ended.

The Asset Inspection Manager has the responsibility to ensure that the CEOT has up to date information on all urgent defective POELs required to be disconnected on Total Fire Ban and Code Red days.

Fires

In accordance with standard operating procedure, the Availability Officer is to be advised immediately of any fires attended by fault crews, regardless of how they were started.

Sustained Unplanned Interruptions to Supply

In accordance with standard operating procedures and policy, if any feeder or HV line protection device operates on Total Fire Ban or Code Red days and supply is interrupted (other than for successful re-closes) and the fault is not known:

- The feeder or line must be patrolled or assessed prior to attempting restoration in accordance with 'Feeder Patrols and Supply Restoration on High Voltage Overhead Lines' *(DOP10-10)* and 'Line Restoration Policy for TFB Days & Code Red Days' *(DOP 90-28)* procedures.

11.2.2 AREA OPERATIONS OFFICER RESPONSIBILITY

The Area Operations Officers will notify the CEOT of any planned interruptions that have been cancelled, and those that have Regional Business Manager's approval to proceed.

The CEOT in turn will:

- Advise the Faults and Emergencies Call Centre and the Customer Services Centre
- Update Power-On to reflect the cancellation
- Liaise with Senior Asset Management representatives as to media releases of cancelled interruptions, where appropriate

This information will be available to the Faults Team Leader no later than 15 minutes prior to the planned interruption time.

11.2.3 AUTO RECLOSE SUPPRESSION & PROTECTION SETTING CHANGES

The Manager Network Operations (CEOT) shall ensure auto reclose is suppressed and protection settings changed in accordance with the 'Protection Device Suppression/Modification Schedule' on designated SWER ACR's, Circuit Breakers and Automatic Circuit Reclosers on 22kV feeders in hazardous bushfire risk areas (HBRAs) on Total Fire Ban and Code Red days. This includes HBRA feeders without Neutral Earthing Resistors (NERs) where the phase to ground fault current could exceed 3.5kA at the zone substation bus.

The schedule includes application of protection sequence settings in accordance with figure 8-2 to the extent that is practicable and possible.

Determination of the 'worst areas' (Extreme HBRA) and 'remaining HBRA' is discussed in section 8.3.10 'Total Fire Ban Day ACR Protection Settings'.

The CEOT will maintain the 'Protection Device Suppression/Modification Schedule' for application of settings on Total Fire Ban and Code Red days. This schedule is provided to Energy Safe Victoria (ESV) in the form required by ESV. Management and control of the protection sequence settings are undertaken in accordance with 'Protection Setting Operation Guidelines on Total Fire Ban and Code Red Days' (BFM 21-10).

Note that the following will apply to feeders within HBRAs during the periods specified below:

Declared Fire Season

- In the Extreme HBRA, SWER ACRs, 22kV Circuit Breakers and 22kV ACRs will have their automatic reclose function suppressed or protection sequence settings modified on Total Fire Ban/Code Red days in accordance with Protection Device Suppression/Modification Schedule.

- In the 'remaining' HBRA protection settings will be applied on Total Fire Ban and Code Red days in accordance with the Protection Device Suppression/Modification Schedule.

Suppression and changes to protection sequence settings on designated devices on Total Fire Ban day or Code Red days shall occur by 10.00am or when the Fire Behaviour Index (FBI) exceeds 30, whichever occurs earlier.

If weather conditions abate, the Manager Network Operations (CEOT) may restore auto reclose suppression to normal. This shall not be carried out until the FBI falls to and remains below 30 in the location of the feeder.

The zone substations that have no Neutral Earth Resistors (NERs) require the feeder CBs to be auto reclose suppressed on days of Total Fire Ban and Code Red, unless the fast protection & control settings have been applied in accordance with the Protection Device Suppression/Modification Schedule.

11.2.4 REFCL PROTECTION SETTINGS

Application of the *'required capacity'* protection setting is applied to REFCL supply networks within areas where a Total Fire Ban or Code Red Day is declared.

Should the REFCL detect a phase to earth fault on a TFB or Code Red day it will compensate[12] for up to 20 seconds[13] before interrupting supply to the effected distribution feeder. Restoration of supply is undertaken in accordance with procedures discussed in Section 11.2.1 'Customer Energy & Operations Team (CEOT) Responsibility'.

Outside periods of heightened bushfire risk REFCLs may be operated at reduced levels of sensitivity as discussed in Section 8.3.9.3 'Rapid Earth Fault Current Limiter Implementation'.

Settings and applications post REFCL implementation are summarised in table 11.1.

Operating Mode	Application
1. Fire Risk (Required Capacity 0.5 amps)	Total Fire Ban Days Exceptions include; • Switching associated with fault & emergency works • 'Standard' may be applied if FBI below 30 (same process as ACR settings)
2. Standard (target range >0.5amps & <2.5amps)	Non TFB Days Application typically applied during declared fire danger period or for fire danger ratings 'High' and above.
3. REFCL-NER (>2.5amps)	Non TFB Days. Application typically applied during winter period or for fire danger ratings below 'High'

Table 11.1 REFCL Protection Mode Settings & Applications

[12] Refer section 8.3.9.3 'REFCL Implementation for explanation of 'compensation'.

[13] Compensation duration may vary subject to on-going development of the technology through ESV/VESI REFCL Technical Working Group.

The REFCL system is a single contingency system and therefore is exposed to the risk of unavailability in the event of a defect. This risk is mitigated through the annual testing program discussed in Section 11.3.2 'REFCL Testing and Reporting'.

11.2.5 POEL DISCONNECTIONS

POELs with urgent defects shall be disconnected for the full period of the Total Fire Ban. However, if the Total Fire Ban commences at midnight and weather conditions during the night are not severe, then it shall be permissible to disconnect the line first thing in the morning, generally prior to 0800 hours or before weather conditions become severe.

Reconnection shall not be undertaken until after the termination of the Total Fire Ban.

11.2.6 NETWORK ACTIVITIES

On Total Fire Ban days the operations and maintenance activities will be restricted to emergency and urgent repairs only.

If restricted activities such as welding, gas cutting, grinding, using a blow lamp or gas torch are to be undertaken on days of Total Fire Ban, a current copy of the appropriate permit must be held on site. All conditions on the permits must be adhered to. AusNet Services personnel must ensure that contractors under their control adhere strictly to the conditions of the permits. Field crews shall ascertain Total Fire Ban status prior to commencement of any work in fire hazard areas.

Work on easements on Total Fire Ban days in fire hazard areas must be suspended, unless otherwise specifically approved by the responsible AusNet Services officer. Before work can commence a risk assessment and approval is to be carried out by the responsible officers.

If a Total Fire Ban day occurs prior to the declaration date for a region, priority outstanding maintenance items, including vegetation management items, shall be managed so that they are fire safe. Where a risk has been identified, courses of action may include fuel reduction within close proximity of assets with outstanding urgent maintenance items or de-energisation of the assets.

11.3 FIRE DANGER PERIOD

11.3.1 GENERAL

Fire danger periods within respective municipalities are declared annually by the Country Fire Authority. Declarations depend on the amount of rain, grassland curing rate and other local conditions within respective municipalities.

The Fire Danger Period may be declared as early as September in some municipalities, and typically remains in place until the fire danger lessens, which could be as late as May.

Operation and maintenance plans during the declared fire period requires all inspections, maintenance and asset replacement activities be undertaken within the nominated periods contained in the asset data management system (SAP) in high bushfire risk areas (HBRAs). The monitoring of this activity is done through the Bushfire Mitigation Index which has a target of zero for HBRAs during fire danger periods.

11.3.2 REFCL TESTING & REPORTING

Testing of REFCLs supplying polyphase networks within the respective municipalities are undertaken prior to declaration of the fire danger period to ensure the REFCL is capable of operating at the *required capacity*[14]. The dates by which respective REFCLs must meet the '*required capacity*' compliance obligations are illustrated in figure 8-3 'REFCL Location and Timing of Implementation'.

Scheduling of testing is undertaken to allow for re-engineering or calibration of the network to achieve the '*required capacity*' prior to the fire danger period each year. During REFCL implementation phases, AusNet Services will demonstrate and seek certification (by submission of test reports to ESV) that the REFCL protected network is operating at the *Required Capacity*. AusNet Services' process of demonstration, certification and validation of regulatory compliance are explained in the following documents:

- REF 30-07-01 REFCL Program REFCL Systems Performance
- REF 30-07-02 REFCL Demonstration of Required Capacity*)*
- REF 30-07-03 REFCL Certification Test Policy
- REF 30-07-04 REFCL Annual Validation Test Strategy
- REF 30-07-05 REFCL Network Configuration & Test Locations
- REF 30-07-06 REFCL REFCL Test facilities

Any major technical issues and resolutions, with regards to achieving *Required Capacity,* are discussed and shared with ESV through the Victorian Electricity Supply Industry (VESI) REFCL technical working group. The technical working group has been established to facilitate shared

[14] '*Required capacity*' as defined by the Electricity Safety (Bushfire Mitigation) Regulations

learnings for the VESI during on-going development and deployment of REFCLs. Project implementation is reported monthly to ESV through standardised reporting templates developed by ESV. This reporting provides transparency as to the number of REFCLs in operation and at what 'capacity' they are performing during the implementation phase.

Subsequent to the implementation phase for each zone substation, annual compliance test reports for each zone substation are provided to ESV as part of the annual pre-summer compliance testing and reporting regime. Compliance testing is required at established test sites on every feeder supplied by a prescribed REFCL zone substation to confirm capability for protection to operate at the prescribed performance specifications to achieve the '*required capacity*'. Network insulation testing of up to 10 minutes is applied.

A compliance testing schedule is provided to ESV annually for ESV personnel to attend and observe compliance testing of respective zone substations.

12 FIRE PREVENTION - INVESTIGATIONS ANALYSIS AND METHODOLOGY

The Network Safety Management Committee (NSMC) monitors a range of network safety performance indicators to identify opportunities to initiate investigations, analysis and implementation of strategies and programs to improve network safety performance. Key fire risk indicators monitored by the NSMC include the Fire Risk Indicator and F-factor which are leading and lagging network performance monitoring tools respectively. These indicators are discussed in further detail below.

12.1 INVESTIGATIONS

Network incidents are investigated and reported to Energy Safe Victoria in accordance with the *'Distribution Business Electrical Safety Performance Reporting Guide'*. The incident investigation and reporting procedure and fault management system (PowerOn) requires the establishment of a root cause and an asset failure consequence. Analysis of network incident data is provided to the NSMC in the formats presented below to monitor and, where required, initiate investigation and development of recommendations to mitigate bushfire risk.

12.2 ANALYSIS

Analysis of the following key performance indicators provides guidance for the on-going development and maintenance of the preventative strategies implemented under the General Maintenance and Enhanced Network Safety programs discussed in Section 8.

12.2.1 POTENTIAL FIRE INCIDENTS INDICATOR

The potential fire incidents indicator includes the sum of all network incidents that have the risk of fire ignition, identified by the respective incident type. Network maintenance and replacement programs have targeted the causes associated with respective incident types in order to significantly reduce the number of network incidents that can result in fire ignitions.

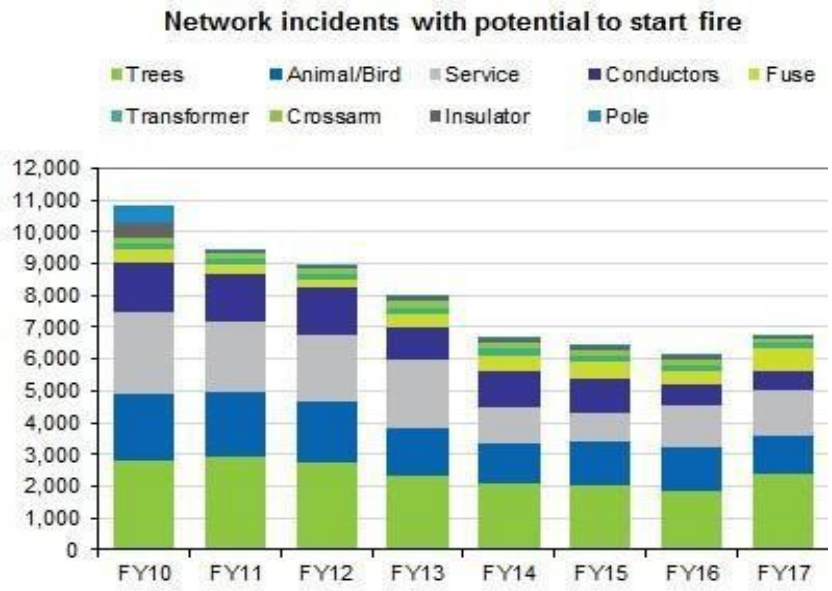


Figure 12-1 Example of Fire Risk Indicator & Annual Target

12.2.2 F-FACTOR

The F-factor is a regulatory incentive mechanism, administered by the Australian Energy Regulator (AER), which has the objective of ensuring distribution businesses have a performance incentive targeted toward the mitigation of network related fire incidents. The F-factor reporting framework monitors actual fire incidents, consequences and their causes. The F-factor scheme was revised in 2016 to introduce a risk weighted value (Ignition Risk Unit) for each fire incident. The IRU is determined through the product of risk weightings applied to factors associated with *time* (fire danger rating) and *geography* (fire loss consequence associated to the location).

Performance under the old and new scheme is shown below. The regulatory targets moving forward include decrements determined by government that are based upon the anticipated benefits from implementation of the mandated Rapid Earth Fault Current Limiter (REFCL) program.

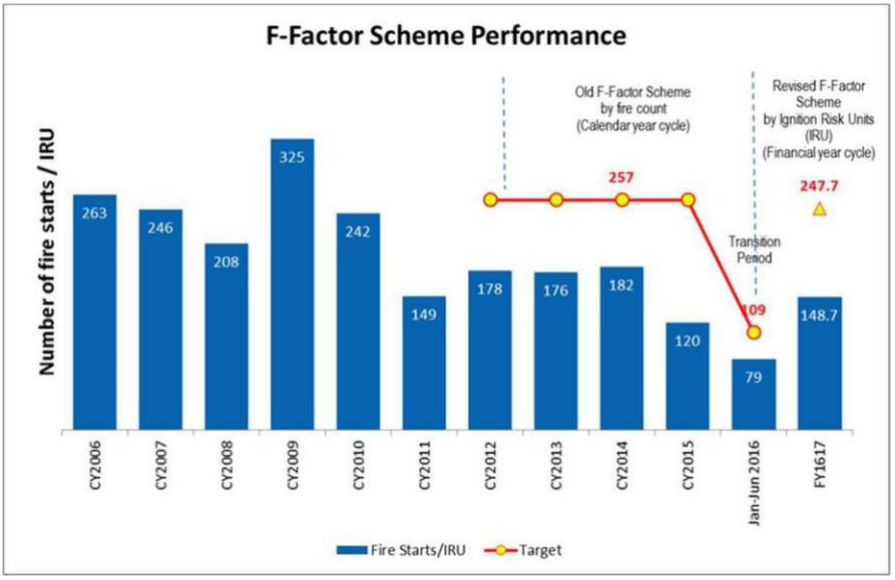


Figure 12-2 Example of F-factor Annual Performance

12.3 METHODOLOGY

The methodology applied to ensure mitigation of bushfire risk includes a full life cycle approach for the design, construction, commissioning, operation, maintenance and de-commissioning of network assets. The NSMC monitors network bushfire performance and, where required, initiates investigation and analysis for the development of strategies to cost effectively mitigate bushfire risks. This continuous improvement process is supported by the broader asset and risk management frameworks provided by the Electricity Safety Management Scheme.

13 MONITORING & AUDIT

13.1 MONITORING PLAN IMPLEMENTATION

Monitoring is undertaken through the Network Safety Management Committee (NSMC). The principal objective and role of the NSMC , is to understand and manage the safety and bushfire risks, in planning, designing, constructing, operating, maintaining and decommissioning its supply networks to minimise in so far as is practicable[15]:

a) the hazards and risks to the safety of any person arising from the supply network;

b) the hazards and risks of damage to the property of any person arising from the supply network; *and*

c) if that network is an at-risk supply network, the bushfire danger arising from that network.

Accordingly, the Charter for the NSMC is to guide development, implementation and monitoring of network asset management strategies and programs with the objective of minimising risks and hazards to persons and property as far as practicable. The committee, whose membership consists of senior personnel from various business streams, provides the operational leadership and coordination of resources engaged in the development and implementation of bushfire mitigation, vegetation management and asset safety programs designed to achieve this objective.

The NSMC utilises a range of performance indicators to monitor implementation of the Plan which are provided in a monthly Network Safety Report. Among key indicators are;

- **Bushfire Mitigation Index** – monitors implementation of inspection, maintenance and replacement activities contained within the General Maintenance program. Maintaining a 'zero index' is a key performance objective during the declared fire season,
- **Enhanced Safety Program reports –** monitors implementation of individual Enhanced Network Safety programs. Exceptions to network performance outcomes or emerging network risks are fed back through the Asset Management Committee for review of the asset management strategies required to address network related bushfire risks.

A hierarchy of management control has been established to monitor performance and control through the structure indicated below.

[15] *'Practicable'* means practicable having regard to: - a) the severity of the hazard or risk in question; b) the state of knowledge about the hazard or risk and any ways of removing or mitigating the hazard or risk; c) the availability and suitability of ways to remove or mitigate the hazard or risk; and d) the cost of removing or mitigating the hazard or risk.

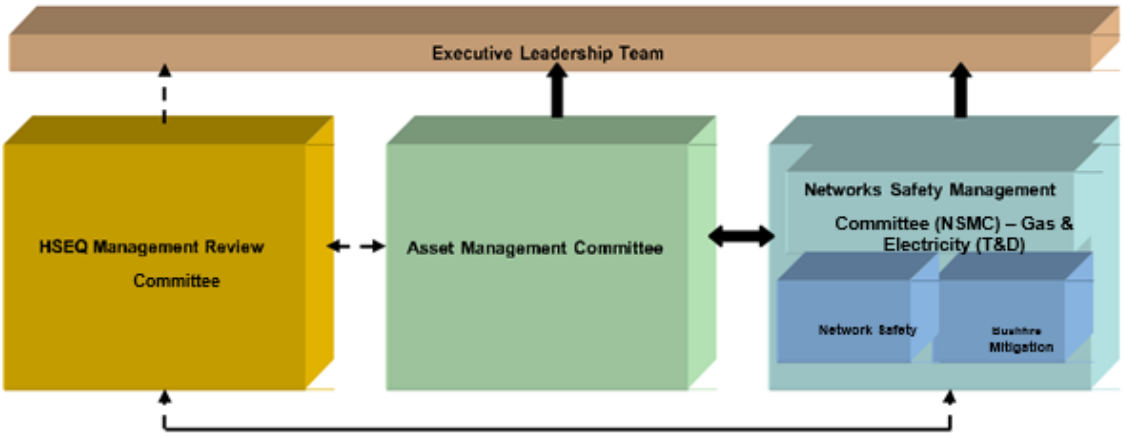


Figure 13-1 Hierarchy of Network Safety Management Control

13.1.1 SENIOR MANAGEMENT REVIEW

An annual review of the Bushfire Mitigation program by the senior and executive management group is undertaken. The objective of the review is to allow operational personnel to communicate and demonstrate to key stakeholders the diversity and operational detail of a key risk mitigation program of the business. The review also provides an opportunity to challenge current aspects of the program that may result in the initiation of further mitigation measures.

13.2 AUDITING PLAN IMPLEMENTATION

AusNet Services assets and processes are subject to regular audits to verify compliance with specified technical, operational and safety standards and legislative requirements. Audits are undertaken in accordance with AusNet Services' standard audit procedures to ensure the requisite compliance is achieved in all aspects of the design, construction, installation, operation and maintenance of the AusNet Services network. Health Safety Environment & Quality audits include:

- Technical compliance
  - Work party occupational health & safety
  - Work sites, depots and offices safety & environment
  - Work quality
  - Asset standards

- Management systems

- Data and information management
- Procedure reviews

Teams undertaking these audits are trained and competent to ensure a consistent and effective approach to auditing is maintained. The audits are undertaken using the asset life cycle methodology of design, construction and maintenance and are undertaken in the following categories relating to bushfire mitigation activities:

- Inspection & assessment
  - Asset inspection
  - Vegetation clearances

- Work execution
  - Work party occupational health & safety
  - Quality of work
    - Compliance with asset standards
    - Compliance with vegetation clearances and practices

Results of the Health, Safety, Environment and Quality (HSE&Q) audits are reported monthly to senior and line management and include audit summaries for the period identifying audits performed against audits scheduled, their percentage score and associated grading; trend analysis and improvement initiatives; and recommendations on future directions.

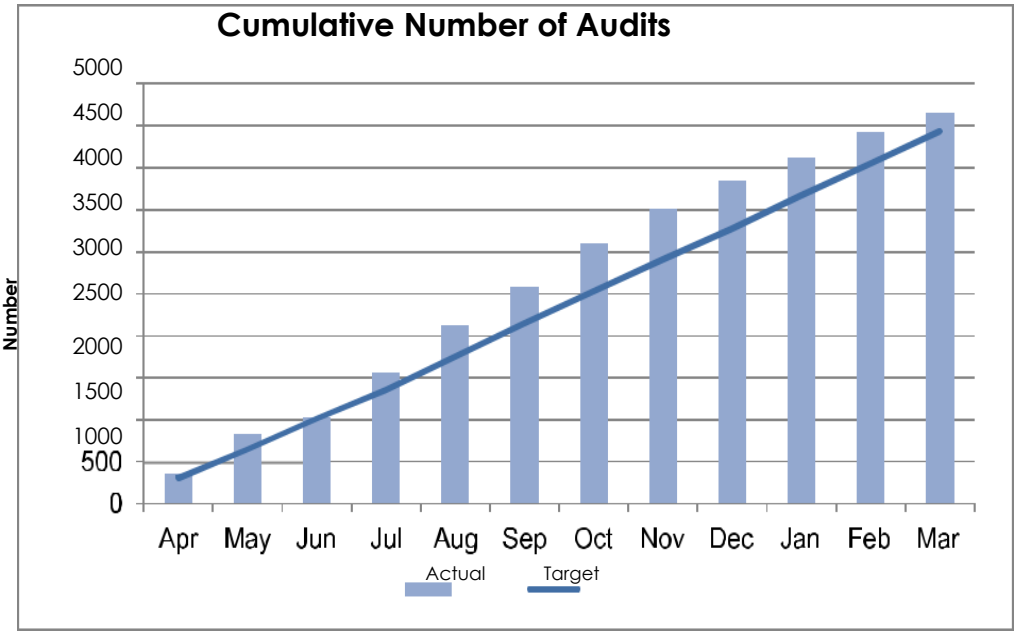


Figure 13-2 Example of Audit Reporting

Audit recommendations and observations are recorded in a quality/issues management system (Enablon) which provides an automated process for notification and follow-up of persons responsible for implementation.

13.2.1 ENERGY SAFE VICTORIA AUDITS

Energy Safe Victoria (ESV) undertake annual audits of AusNet Services' Bushfire Mitigation Plan and of the Electricity Safety Management System. Agreed recommendations and observations have an implementation plan developed and actions assigned to responsible persons.

13.2.2 CERTIFICATION AUDITS

Certification for the following management systems is maintained through a program of regular mandatory compliance audits by independent and accredited service providers:

- ISO 55001 – Asset Management – Management Systems
- AS 4801 – Occupational Health & Safety System
- ISO 9001 – Quality Management System
- ISO 14001 – Environmental Management System

13.3 PLAN EFFECTIVENESS

The Network Safety Management Committee (NSMC) identifies deficiencies in the Plan's implementation through the following key performance indicators;

Bushfire Mitigation Index – The BMI monitors progress in the inspection of assets and assessment of vegetation against program target dates. The BMI then monitors the completion of asset maintenance and replacement activities identified through the inspection and assessment programs.

Enhanced Network Safety Programs - The delivery of individual asset management strategies against program targets is monitored and reported quarterly to Energy Safe Victoria.

The Network Safety Management Committee identifies deficiencies in the Plan's effectiveness through the following key performance indicators:

Potential Fire Incidents Indicator – This provides a leading indicator through monitoring of all network incidents with the potential to result in fire. This is used to identify opportunities for corrective strategies to mitigate bushfire risk.

F-factor – A regulatory performance based incentive mechanism designed to direct network investment into the reduction of fire incidents.

Fire Incidents – Individual fire incidents are reviewed and reported in the monthly Network Safety Report to the NSMC.

13.4 INSPECTIONS EFFECTIVENESS

The effectiveness of inspection programs is critical with ensuring the safe and reliable operation of the network. Investigations and analysis, discussed in Section 12, of network asset failures provides an iterative process for review of inspection programs to ensure their effectiveness.

Two key areas of focus that ensure inspection programs remain effective are:

- Inspection criteria & methods, *and*
- Quality of inspections undertaken.

13.4.1 ASSET CONDITION ASSESSMENT CRITERIA & METHODS

Continuous monitoring and analysis of asset failures provides opportunities to identify modifications to current asset assessment, maintenance or replacement criteria that will further mitigate the risk of failure. This process, which includes application of analysis methodologies such as Failure Modes Effects and Cause Analysis (FMECA), supports AusNet Services' Asset Management Strategy (AMS 20-01) and its suite of individual asset management strategies.

Asset performance indicators such as the Potential Fire Incidents Indicator and F-factor are tools that are used to identify opportunities to develop practicable and effective inspection criteria or methods that can be cost effectively deployed to prevent failures. This continuous improvement and development process for asset inspection has resulted in the following methods and techniques, which are consistent with the *ENA Inspection Guideline*[16], being utilised in asset inspection;

- Thermography surveys,
- Radio frequency surveys,
- Corona surveys,
- Intrusive testing criteria and treatment of timber poles,
- Calibration of visual asset inspection criteria,
- High resolution digital photography supported by
    - Helicopter mounted cameras,
    - Telescopic stick mounted camera,
    - Unmanned aerial vehicle mounted cameras,

[16] Energy Networks Association, Industry Guideline for the Inspection, Assessment and Maintenance of Overhead Powerlines, ENA Doc 017-2008

  - Ground based inspector use of cameras.
- Sampling and forensic analysis of asset components,
- Asset management systems to support recording and monitoring of asset performance,
- Energy Safe Victoria approved inspection training courses

13.4.2 QUALITY OF INSPECTIONS

Within the corporate Health Safety Environment and Quality (HSE&Q) Management System auditing framework discussed in Section 13.2, is the audit of ground and aerial based asset inspection and vegetation clearance assessments. Audits of individual inspectors and assessors are undertaken against established sampling rates and quality assessment criteria. The assessment template is designed to monitor an inspector or assessor's level of compliance and competence with inspection of assets in accordance with the criteria and standards contained in the Asset Inspection Manual. The templates assign appropriate levels of risk weighting to individual inspection criteria. An inspector or assessor's inspection quality is monitored and discussed with the individual to ensure the maintenance of required standards.

13.5 PLAN IMPROVEMENTS

The Network Safety Management Committee monitors the following indicators to identify, initiate and implement opportunities for improvement of the Plan's overall effectiveness:

- Asset performance indicators
  - Potential Fire Incidents Indicator,
  - F-factor
- Program implementation indicators
  - Bushfire Mitigation Index,
  - Enhanced Network Safety Program implementation
- Audits
  - Inspection & assessment audits,
  - Work quality audits,
  - Energy Safe Victoria compliance audits, *and*
  - Certification surveillance & compliance audits

13.6 TRAINING

AusNet Services has established 'Skilling for the Future' strategies that identify long term resource levels and skill mix requirements. Post descriptions for the respective roles within AusNet Services' work environment contain qualification, skills and competency requirements. AusNet Services'

personnel are managed through a centralised human resource data base. Contractual arrangements for external resource provision specify minimum qualifications, skills and competency requirements.

The minimum level of skill and competence for each category of worker is established by the Victorian Electricity Supply Industry (VESI) and are based on the standards in the national Electricity Supply Industry (ESI) – Transmission, Distribution and Rail Sector Training Package (UET09) in accordance with National Competency Guidelines. This includes initial and cyclic refresher training requirements. Competencies and training of service providers are managed by the respective service providers and are also required to comply with the Electricity Supply Industry requirements.

National training competencies are delivered by a Registered Training Organisation (RTO) whose scope of registration includes the required competencies. All RTOs are required to meet the standards as outlined in the 2007 training framework[17]. All Passport refresher modules which are not nationally accredited may be delivered by a person who holds as a minimum a Certificate IV in Workplace Training and Assessment (or equivalent) and is able to demonstrate vocational competence and experience in the subject matter of the Passport module they are delivering.

To ensure only competent and qualified personnel are permitted to work on the electrical network, competencies and training are recorded in AusNet Services' learning content management systems and are shown in the individual's VESI Network Passport.

AusNet Services' training and competency requirements are reflected, as required, in respective contracts with third party service providers.

Section 6.11 'Training and Competency' of the Electricity Safety Management System details the enterprise wide framework.

13.6.1 ASSET INSPECTION TRAINING COURSE

The training courses for AusNet Services' asset inspectors and assessors are approved by Energy Safe Victoria as required by the Electricity Safety (Bushfire Mitigation) Regulations. Refer Appendix 4.

13.7 INSPECTOR COMPETENCY

13.7.1 AUDIT

Competence of inspectors is essential to ensuring the on-going effectiveness of inspection programs and their ability to maintain the safe and reliable operation of the network. Accordingly,

[17] Australian Quality Training Framework 2007 - Essential Standards for Registration

work quality audits for individual inspectors engaged in asset and vegetation inspection are undertaken against established sampling rates and quality assessment criteria. The respective assessment templates are designed to monitor an inspector's level of compliance and competence with inspection of assets or vegetation in accordance with criteria and standards contained in the Asset Inspection Manual and Vegetation Management Plan respectively. The templates assign appropriate levels of risk weighting to individual inspection criteria. An inspector's quality of work is monitored and discussed with the individual to ensure the maintenance of required standards.

13.7.2 MONITORING

The results of audits are monitored to identify deficiencies and trends that require implementation of corrective actions. In accordance with AusNet Services' quality management system and procedures, corrective actions are recorded in a quality management system (Issues Management System) and implementation of actions monitored through the Network Safety Management Committee.

14 PUBLIC AWARENESS

14.1 GENERAL

It is essential that the community be aware of the potential fire hazards that can arise from the poor maintenance of Private Electric Lines and the selection of inappropriate vegetation species for planting near powerlines. To address this, a comprehensive communication program focusing on the following issues is maintained:

- The potential of the Distribution Network to be a cause of fire ignition
- Trees and powerlines do not mix; and
- Reminders to Private Electric Line owners of their responsibilities.

Publications made available to customers may include the following:

Publication Material	Availability
Your Guide to Planting Near Powerlines	Freshwater Place Southbank (8.30 am to 5.00 pm Monday to Friday). Call Centre **1300 360 795** www. ausnetservices.com.au/
Brochure *Private Electric Lines Your Responsibilities*	Freshwater Place Southbank (8.30 am to 5.00 pm Monday to Friday). Call Centre **1300 360 795** www. ausnetservices.com.au/
BFM Advertising Material	Regional TV, Radio, Newspaper & Billboards www. ausnetservices.com.au/

Figure 14-1 Customer Information Publications

Advertising campaigns are undertaken utilising a combination of the following media:

- Visually descriptive television awareness campaigns

- Newspaper advertisements in various newspapers
- Articles and advertisements in various journals and magazines
- Radio commercials communicating fire awareness messages; *and*
- Other mediums as the opportunity arise.

The Public Relations & Communications Manager ensures effectiveness of communication programs through:

- Review of the effectiveness of public awareness programs
- Making recommendations to the Network Safety Management Committee on the public awareness program; *and*
- Co-ordinate the public awareness program.

14.2 PRIVATE ELECTRIC LINE BROCHURE

To remind customers of their responsibilities and the importance of their bushfire mitigation activities, reminders are distributed annually to the occupiers of land with overhead Private Overhead Electric Lines (POEL). The reminder provides information concerning the typical hazards associated with POELs.

Wherever a "Defect Notice" is issued to a customer with a POEL, the brochure outlining responsibilities is issued to the occupier of the land.

14.3 AUSNET SERVICES OBLIGATIONS

The brochure 'Private Overhead Electric Lines, Your Responsibilities' contains the following information concerning AusNet Services' obligations for inspection.

> *The Electricity Safety (Bushfire Mitigation) Regulations require AusNet Services to inspect private overhead electric lines. AusNet Services regularly inspects its powerlines in your area. AusNet Services will also inspect the part of your overhead electric lines from the point of supply to the meter and, if AusNet Services finds any defects, will issue you with a rectification notice that you need to comply with. AusNet Services' current cycle for*

inspections of private overhead electric lines is at least once every 37 months in hazardous bushfire risk areas; and at least once every 61 months in low bushfire risk areas.

AusNet Services also ensures customer notification of POEL inspection is not more than 45 days before an inspection and not less than 21 days before the inspection. Customer notification is provided in the form provided in the Schedule to the *Electricity Safety (Bushfire Mitigation) Regulations*.

14.3.1 INSPECTION STANDARD FOR POEL

The inspection of a POEL is undertaken in accordance with the standards prescribed under regulation 10 of the *Electricity Safety (Bushfire Mitigation) Regulations.*

15 APPENDICES

15.1 APPENDIX 1 - PRESCRIBED PARTICULARS OF BUSHFIRE MITIGATION PLAN

Regulation	Electricity Safety (Bushfire Mitigation) Regulations 2023 Requirement	Reference in Plan
7 (1)(a)	the name, address and telephone number of the major electricity company	Section 7
7 (1)(b)	the position, address, email address and telephone number of the person who was responsible for the preparation of the plan	Section 7
	who was responsible for the preparation of the plan	
7 (1)(c)	the position, address, email address and telephone number of the persons who are responsible for carrying out the plan	Section 7
7 (1)(d)	the email address (if any) and telephone number of the major electricity company's control room so that persons in the room can be contacted in an emergency that requires action by the major electricity company to mitigate the danger of bushfire	Section 7
7 (1)(e)	the telephone number of the major electricity company that members of the public can call in an emergency that requires action by the major electricity company to mitigate the danger of bushfire	Section 7
7 (1)(f)	the bushfire mitigation policy of the major electricity company to minimise the risk of fire ignition from its supply network;	Section 3.1
7 (1)(g)	the objectives of the plan to achieve the mitigation of fire danger arising from the major electricity company's supply network	Section 2
7 (1)(h)	a description, map or plan of the land to which the bushfire mitigation plan applies	Section 6
7 (1)(i)	the preventative strategies and programs to be adopted by the major electricity company to minimise the risk of the major electricity company's supply network starting fires	Section 8 Section 9 Section 11
7 (1)(j)	details of the preventative strategies and programs referred to in paragraph (i) (including details in relation to timing and location) by which the major electricity company will ensure that, in its supply network, each polyphase electric line originating from every zone substation specified in Schedule 1 has the required capacity	Section 8.2 Section 8.3 Section 8.3.9.3, 8.3.9.4 Section 11 Section 11.3.1
7 (1)(k)	details of testing that will be undertaken before the specified bushfire risk period each year by which the major electricity company will ensure that its supply network can operate to meet the required capacity in relation to each polyphase electric line in accordance with paragraph (j)	Sec 11.3.1
7 (1)(l)	details of the preventative strategies and programs referred to in paragraph (i) (including details in relation to timing and location) by which the major electricity company will ensure that, within an electric line construction area, each electric line with a nominal	Section 8.3.6 Section 8.3.7

Regulation	Electricity Safety (Bushfire Mitigation) Regulations 2023 Requirement	Reference in Plan
	voltage of between 1 kV and 22 kV that is constructed, or is wholly or substantially replaced, in its supply network is a covered or underground electric line	
7 (1)(m)	details of the preventative strategies and programs referred to in paragraph (i) by which the major electricity company will ensure that, in its supply network, each low voltage overhead electrical cable or wire that is constructed after the commencement of these Regulations in a hazardous bushfire risk area is insulated	Section 8.3.8
7 (1)(n)	details of the processes and procedures by which the major electricity company will ensure that the major electricity company installs and maintains in operation an Automatic Circuit Recloser in relation to each overhead SWER line in its supply network	Section 8.3.9.1
7 (1)(o)	a plan for inspection that ensures that— (i) the parts of the major electricity company's supply network in hazardous bushfire risk areas are inspected at intervals not exceeding 37 months from the date of the previous inspection; and (ii) the parts of the major electricity company's supply network in other areas are inspected at specified intervals not exceeding 61 months from the date of the previous inspection	Section 9.1
7 (1)(p)	details of the processes and procedures for ensuring that each person who is assigned to carry out inspections referred to in paragraph (o) and of private electric lines— (i) has satisfactorily completed a training course approved by Energy Safe Victoria; and (ii) is competent to carry out the inspections;	Section 10.2 Section 13.4.2
7 (1)(q)	details of the processes and procedures for ensuring that persons (other than persons referred to in paragraph (p)) who carry out or will carry out functions under the plan are competent to do so	Section 14
7 (1)(r)	the operation and maintenance plans for the major electricity company's supply network— (i) in the event of a fire; and (ii) during a total or partial fire ban day; and (iii) during a fire danger period	Section 11
7 (1)(s)	the investigations, analysis and methodology to be adopted by the major electricity company for the mitigation of the risk of fire ignition from its supply network	Section 12
7 (1)(t)	details of the processes and procedures by which the major electricity company will— (i) monitor the implementation of the bushfire mitigation plan; and (ii) audit the implementation of the plan; and (iii) identify any deficiencies in the plan or the plan's implementation; and (iv) change the plan and the plan's implementation to rectify any deficiencies identified under subparagraph (iii); and (v) monitor the effectiveness of inspections carried out under the plan; and (vi) audit the effectiveness of inspections carried out under the plan; and (vii) before the specified bushfire risk period each year,	Section 13 Section 11.3.1

Regulation	Electricity Safety (Bushfire Mitigation) Regulations 2023 Requirement	Reference in Plan
	report to Energy Safe Victoria the results of testing undertaken in that year in accordance with paragraph (k)	
7 (1)(u)	the policy of the major electricity company in relation to the assistance to be provided to fire control authorities in the investigation of fires near the major electricity company's supply network	Section 11.1
7 (1)(v)	details of processes and procedures for enhancing public awareness of— (i) the responsibilities of owners of private electric lines that are above the surface of the land in relation to maintenance and mitigation of bushfire danger; and (ii) the obligation of the major electricity company to inspect private electric lines that are above the surface of the land within its distribution area	Section 15
7 (1)(w)	a description of the measures to be used to assess the performance of the major electricity company under the plan	Section 13
Act	**Electricity Safety Act 1998 Requirement**	**Reference in Plan**
113A (3)	A major electricity company must cause a copy of its accepted bushfire mitigation plan to be made available for inspection- (a) on the company's Internet site; and (b) at the company's principal office in the State during ordinary business hours.	Section 7
120N	Covering or placing underground electric lines (1) A major electricity company must cover or place underground each new electric line that meets the prescribed specification that it constructs within an electric line construction area. (2) A major electricity company must cover or place underground each electric line that— (a) meets the prescribed specification; and (b) it reconstructs or substantially reconstructs within an electric line construction area; and (c) is of at least 4 consecutive spans or has conductors on at least 4 consecutive spans.	Section 8.3.6 Section 8.3.7 Regulation 7 (1)(l) compliance table above

15.2 APPENDIX 2 – SAMPLE DISPLAY OF HBRA & LBRA AREAS

Sample Spatial Analysis Management System (SAMS) display of the HBRA & LBRA fire zones and Electricity Assets for the AusNet Services Distribution area.

Figure 15-1 SAMS display, LBRA shown in 'light blue'

The SAMS information related to electrical assets will be made available to the public on request at our Freshwater Place office at 2 Southbank Boulevard, Southbank (8.30 am to 5.00 pm Monday to Friday) preferably with 24 hour prior notice.

15.3 APPENDIX 3 – VBRC COMPLIANCE MATRIX

2009 VBRC Recommendations	Reference within this Plan
VBRC Recommendation 27 The State amend the Regulations under Victoria's Electricity Safety Act 1998 and otherwise take such steps as may be required to give effect to the following: The progressive replacement of all SWER power lines in Victoria with aerial bundled cable, underground cabling or other technology that delivers greatly reduced bushfire risk. The replacement program should be completed in the areas of highest bushfire risk within 10 years and should continue in areas of lower bushfire risk as the lines reach the end of their engineering lives. The progressive replacement of all 22kV distribution feeders with aerial bundled cabling or other technology that delivers greatly reduced bushfire risk as the feeders reach the end of their engineering lives. Priority should be given to distribution feeders in the areas of highest bushfire risk. **PBST Recommendation 1** Electricity distributors implement the 2009 Victorian Bushfire Royal Commission's recommendation 27 by: a) installing new generation protection devices to instantaneously detect and turn off power at a fault on high fire risk days: • on SWER powerlines in the next five years (new generation SWER ACRs) • on 22kV powerlines in the next 10 years (rapid earth fault current limiters) b) target replacement of SWER11 and 22kV powerlines with underground or insulated overhead cable, or conversion of SWER to multi-wire powerlines, in the next 10 years to the level of between $500 million and $3 billion, consistent with the package of measures selected by the Victorian Government. These should be implemented in the highest fire loss consequence areas first. Any new powerlines that are built in the areas targeted for powerline replacement should also be built with underground or insulated overhead cable.	PBST 1a) – refer sections 8.3.9, 8.3.10. PBST 1b) – refer sections 8.3.7, 8.4
VBRC Recommendation 28 The State (through ESV) require distribution businesses to change their asset inspection standards and procedures to require that all SWER and all 22kV feeders in areas of high bushfire risk are inspected at least every three years. ***Electricity Safety (Bushfire Mitigation) Regulations 2013, regulation 7(i)***	Reg 7(i) – refer sections 10.1 & table 9.1
VBRC Recommendation 29 The State (through ESV) require distribution businesses to review and modify their current practices, standards and procedures for the training and auditing of asset inspectors to ensure that registered training organisations provide adequate theoretical and practical training for asset inspectors. ***Electricity Safety (Bushfire Mitigation) Regulations 2013, regulation 7(j)***	Reg 7(j) – refer sections 10.2 & 13.6.1

<table>
<tr><th>2009 VBRC Recommendations</th><th>Reference within this Plan</th></tr>
<tr><td>VBRC Recommendation 30
The State amend the regulatory framework for the electricity safety to require that distribution businesses adopt, as part of their management plans, measures to reduce the risks posed by hazard trees - that is, trees that are outside the clearance zone but that could come in contact with an electric power line having regard to the foreseeable local conditions.</td><td>VBRC 30 refer- section 8.3.2</td></tr>
<tr><td>VBRC Recommendation 32
The State (through ESV) require distribution businesses to do the following;
Disable the reclose function on the automatic circuit relcosers on all SWER lines for the six weeks of greatest risk in every fire season;
Adjust the reclose function on the automatic circuit reclosers on all 22kV feeders on all total fire ban days to permit only one relose attempt before lockout.
PBST Recommendation 2
Electricity distributors implement the 2009 Victorian Bushfires Royal Commission's recommendation 32 by adjusting the protection systems for 22kV and SWER powerlines based on the severity of the day and the fire loss consequence of the area so that at a fault there are:
Powerline Bushfire Taskforce Recommendation 2
Electricity distribution businesses should adjust the protection systems for 22kV and SWER powerlines based on the severity of the day and the fire loss consequence of the area so that at a fault there are:
<table><tr><th>Area</th><th>Total Fire Ban day</th><th>Code Red day</th></tr><tr><td>Rural powerlines in the worst areas (approximately 20 per cent of rural powerlines)</td><td>Two fast protection operations</td><td>One fast protection operation</td></tr><tr><td>Rural powerlines in remaining areas (approximately 80 per cent of rural powerlines)</td><td>One fast and one slow protection operation</td><td>One fast and one slow protection operation</td></tr></table>For the 2011/12 fire season, to the extent practicable and possible, the electricity distributors change the protection systems at 10.00am or when the fire danger index exceeds 30, whichever occurs earlier, until the fire danger index falls below 30.</td><td>PBST 2 – refer sections 8.3.9 & 11.2</td></tr>
<tr><td>VBRC Recommendation 33
The State (through ESV) require distribution businesses to do the following:
Fit spreaders to any lines with a history of clashing or the potential to do so.
Fit or retro-fit all spans that are more than 300 metres long with vibration dampers as soon as is reasonably practicable.
ESV Directives
• ESV approved AusNet Services Plan – Conductor Spacers AMS 20-52-2
• ESV approved AusNet Services Plan – Vibration Dampers & Armour Rods AMS 20-52-1</td><td>ESV Directives – refer sections 8.2.4, 8.3.12 & 8.3.11</td></tr>
<tr><td>VBRC Recommendations 27 & 32
The PBST provided a range of recommendations to 'ensure the greatest benefits of the Taskforce's recommendations 1 & 2.' The Victorian government accepted PBST recommendation 3(h) that relates to distribution businesses.
PBST Recommendation 3 (h)
By 30 June 2012, the electricity distributors submit a plan to ESV to reduce the fire risk associated with low voltage lines and service lines where it is cost effective to do so,</td><td>Refer section 8.4.3.1</td></tr>
</table>

15.4 APPENDIX 4 – APPROVED INSPECTION TRAINING COURSE

ESV ref: G61045

19 October 2011

David Ellis
Campus Manager
Chadstone Campus
Central Gippsland Institute of TAFE
41 Drummond Street
CHADSTONE VIC 3148

Dear Mr Ellis

ASSET INSPECTION TRAINING COURSE

As you are aware, the Electricity Safety (Bushfire Mitigation) Regulations 2010 require persons carrying out asset inspections to have satisfactorily completed a training course approved by Energy Safe Victoria (ESV). In consultation with the industry, GippsTAFE has been developing a Certificate II Asset Inspection course to meet this need.

GippsTAFE has prepared the detailed course content for two of the key elements and these have been reviewed by ESV. Although some minor modifications have been requested, the course content for these two elements has been assessed as satisfactory. As discussed with Noel Sutcliffe at a recent meeting, ESV requests that you forward the detailed course content for the remaining elements as they are prepared.

ESV has also reviewed the process for the recognition of prior learning (RPL) for the course and has assessed this as highly satisfactory. ESV understands that around 90 RPL applications have been assessed and found to be satisfactory, and that a further 20 are yet to be assessed. ESV would like to be informed of the outcome of the assessment of the remaining applications.

Based on the material provided, I am pleased to advise you that ESV has approved the Certificate II Asset Inspection Course.

Should you have any queries in relation to this matter, please contact Ian Marks on 9203 9730.

Yours sincerely

Paul Fearon
DIRECTOR OF ENERGY SAFETY

energysafe VICTORIA

Creating a safer state with electricity and gas

ESV Ref: CM-334

12 November 2012

Mr David Matassoni
Manager Network Safety
SP AusNet
Locked Bag 14501
MELBOURNE VIC 8001

Dear Mr Matassoni

APPROVAL OF TRAINING COURSE FOR LINESMEN TO INSPECT OVERHEAD ASSETS

As you are aware, section 5A(k) of the Electricity Safety (Bushfire Mitigation) Regulations 2003 (*the regulations*) requires persons carrying out asset inspections to have satisfactorily completed a training course approved by Energy Safe Victoria (ESV).

GippsTAFE provides asset inspection training for Distribution workers as part of the Distribution Apprentice Linesmen course.

The relevant units of the Distribution Apprentice Linesmen course provided by GippsTAFE currently are:

- UETTDRDP01B (or UETTDRDP11A) - Inspect overhead structures and electrical apparatus (poles /structures)
- UETTDREL02B (or UETTDREL12A) - Operate plant and equipment near live electrical conductors/apparatus
- UETTDREL04B (or UETTDREL16A) - Working safely near live electrical apparatus as non electrical worker
- UEENEEE001B (or UEENEEE101A) - Apply OHS practices in the workplace

(Future units as per changes to the National Qualifications are noted in brackets. Future units are part of UET30612, Certificate III in ESI – Power Systems – Distribution Overhead)

ESV has reviewed the unit outline associated with the Distribution Apprentice Linesmen course, and accepts that upon satisfactory completion of the Distribution Apprentice Linesmen scheme, together with SP AusNet's Asset Inspection Training Requirements (SOP 22-02, Issue Number 2, Date of Approval 6/8/2012), meets the requirements of the regulation for training of distribution linesmen to inspect pole top assets.

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Victoria

An associated issue is the assessment of Recognised Prior Learning (RPL) for existing distribution linesmen that are required to inspect pole top assets. As all current distribution linesmen are required to have completed the above units or equivalent, or will be refreshed in these units or equivalent units in the future, and have relevant field experience, it is permitted for these distribution linesmen to perform pole top inspection.

In order to finalise this matter, could you please amend SPI Electricity's Bushfire Mitigation Plan (2012/13) to show these units and any other required training to be the minimum for distribution linesmen to perform pole top asset inspections.

Should you have any queries in relation to this matter, please call Gavin Jackson on (03) 9203 9753.

Yours sincerely

N. Murray

Noel Murray
MANAGER ELECTRICAL INFRASTRUCTURE SAFETY

15.5 APPENDIX 5 – REFCL EXEMPTIONS

15.5.1 COMPLIANCE DEADLINES

#	Date exemption granted	Exemption under the Act[18]	Exemption under the Regulations[19]	Conditions of exemption under the Regulations
1	12/7/19	The "initial period" for which AusNet Electricity Services Pty Ltd (ABN 91 064 651 118) (AusNet Services) must comply with section 120M(1)(a) of the Act to be the period beginning 1 November2019 and ending 30 April 2021	Exempts AusNet Electricity Services Pty Ltd ABN 91 064 651 118 (AusNet Services) from compliance with regulation 7(3)(a)(i) in relation to any Bushfire Mitigation Plan it submits to Energy Safe Victoria prior to 1 November 2019	1. By 1 May 2019, AusNet Services must ensure that a sufficient number of its zone substations to achieve no less than 23 points in Schedule 2 of the Regulations are totalled. 2. AusNet Services must submit an acceptable plan to ESV within 10 business days of granting this exemption that must detail the mitigation measures and milestones by which AusNet Services aims to achieve compliance with regulation 7(3)(a)(i) of the Regulations by 1 November 2019. 3. AusNet Services must report on a monthly basis to Energy Safe Victoria its progress toward the Plan

[18] Exemption under Section 120X(3)(a) of the Electricity Safety Act 1998 and after consultation with the Energy Minister

[19] Exemption under regulation 13 of the Electricity Safety (Bushfire Mitigation) Regulations 2013

#	Date exemption granted	Exemption under the Act[20]	Exemption under the Regulations[21]	Conditions of exemption under the Regulations
2	21/11/19	The "initial period" for which AusNet Services must comply with section 120M(1)(a) of the Act to be the period beginning 29 April 2021 and ending at the commencement of the "intermediate period".	Exempts AusNet Electricity Services Pty Ltd ABN 91 064 651 118 (AusNet Services) from compliance with regulation 7(3)(a)(i) in relation to any Bushfire Mitigation Plan it submits to ESV prior to 29 April 2021	1. By 1 January 2020, AusNet Services must ensure that a sufficient number of its zone substations have the required capacity in order to achieve no less than 23 points when the points for each complying substation listed in the table set out in Schedule 2 of the Regulations are totalled. 2. By 1 November 2020, AusNet Services must ensure that a sufficient number of its zone substations have the required capacity in order to achieve no less than 28 points when the points for each complying substation listed in the table set out in Schedule 2 of the Regulations are totalled. 3. AusNet Services must report on a monthly basis to ESV its progress in implementing the plan to achieve compliance with regulation 7(3)(a)(i) of the Regulations.

[20] Exemption under Section 120X(3)(a) of the Electricity Safety Act 1998 and after consultation with the Energy Minister

[21] Exemption under regulation 13 of the Electricity Safety (Bushfire Mitigation) Regulations 2013

#	Date exemption granted	Exemption under the Act[22]	Conditions of exemption under the Act	Exemption under the Regulations[23]	Conditions of exemption under the Regulations
3	27/04/2021	The "intermediate period" for which AusNet Electricity Services Pty Ltd (ABN 91064 651 118) (AusNet Services) must comply with section 120M(1)(b) of the Act to be the period beginning 1 November 2022 and ending 30 April 2023	Pursuant to section 109(1) of the Act, AusNet Services must submit a revised bushfire mitigation plan to ESV which: 1. Addresses how AusNet Services will comply with the conditions specified by ESV in the exemption dated 27 April 2021 pursuant to regulation 13(2) of Regulations 2. Has a revision date of 1 July 2021	Exempts AusNet Electricity Services Pty Ltd ABN 91 064 651 118 (AusNet Services) from compliance with regulation 7(3)(a)(ii) in relation to any Bushfire Mitigation Plan it submits to Energy Safe Victoria prior to 1November 2022	1. At 1 May 2021,AusNet Services must ensure that a sufficient number of its zone substations have the required capacity in order to achieve no less than 44 points when the points for each complying substation listed in the table set out in Schedule 2 of the Regulations are totalled. 2. At 1 November 2021, AusNet Services must ensure that a sufficient number of its zone substations have the required capacity in order to achieve no less than 47points when the points for each complying substation listed in the table set out in Schedule 2 of the Regulations are totalled. 3. AusNet Services must report on its progress towards achieving the above requirements to ESV every month in a written format acceptable to ESV.

[22] Exemption under Section 120X(3)(a) of the Electricity Safety Act 1998 and after consultation with the Energy Minister

[23] Exemption under regulation 13 of the Electricity Safety (Bushfire Mitigation) Regulations 2013

15.5.2 EXEMPTIONS IN RELATION TO REFCL PROTECTED NETWORKS

The following table summarises the sections of multi-phase network which are not REFCL protected.

Zone Substation	Feeder ID	GPS Coordinates	Construction	Location	Description
Barnawartha (BWA)	BWA23	Lat -36.011063 Long 146.405899	UG	13 Talbot Road, Wahgunyah	Underground cable (UG) to HV customer beyond Zero Sequence isolating transformer
	BWA21	Lat -36.073164 Long 146.716884	UG	outside BWA Zone substation	
Wangaratta (WN)	WN5	Lat -36.912688 Long 146.391507	UG	1660 Upper King River Road, Chestnut South	
	WN7	Lat -36.359574 Long 146.301633	UG	Sisely Avenue, Wangaratta	
Seymour (SMR)	SMR23	Lat -37.013737 Long 145.040318	UG	Puckapunyal Army Base	
	SMR12	Lat -37.007270 Long 145.067708	UG		
Wonthaggi (WGI)	WGI21	Lat -38.607462 Long 145.548353	UG	Wonthaggi Wind farm	
Rubicon A (RUBA)	RUBA24	Lat -37.242891 Long 145.896774	UG	Pacific Energy Eildon Pondage Generation	
Woori Yallock (WYK)	WYK13	Lat -37.75558015 Long 145.68053882	Hybrid	3300 Warburton Highway, Warburton	Capacitive management, Hybrid network beyond Zero Sequence isolating transformer
	WYK13	Lat -37.763397 Long 145.695878	Hybrid	34 Clarke Avenue, Warburton	
	WYK13	Lat -37.75428498 Long 145.588387	Hybrid	1855 Don Road, Don Valley	
	WYK13	Lat -37.7285754 Long 145.5923556	Hybrid	1545 Don Road, Don Valley	
	WYK24	Lat -37.684811 Long 145.556591	Hybrid	110 Badger Weir Road, Badger Creek	
	WYK24	Lat -37.69067633 Long 145.54714054	Hybrid	2 Old Don Road, Badger Creek	
	WYK24	Lat -37.66252333 Long 145.54380802	Hybrid	20 Gibbs Road, Healesville	

Zone Substation	Feeder ID	GPS Coordinates	Construction	Location	Description
Kinglake (KLK)	KLK11	Lat -37.522157 Long145.35071	UG	1 Hawkins Drive, Kinglake	UG network beyond Zero Sequence isolating transformer
	KLK11	Lat - 37.534848 Long 145.450509	Hybrid	2039 Healesville-Kinglake Road, Toolangi	Hybrid network beyond Zero Sequence isolating transformer
	KLK11	Lat -37.530891 Long 145.462154	Hybrid	1870 Healesville-Kinglake Road, Toolangi	
	KLK11	Lat -37.573878 Long 145.509949	Hybrid	1015 Myers Creek Road, Toolangi	
	KLK11	Lat -37.436995 Long 145.420424	UG (SWER)	3682 Melba Hwy, Glenburn	UG network beyond Zero Sequence isolating transformer
Moe (MOE)	MOE15	Lat -37.955385 Long 146.401597	UG	50 Depot Road, Rawson	UG network beyond Zero Sequence isolating transformer
Wodonga and Tallangatta (WOTS)	WOTS23	Lat -36.15642 Long 146.95084	UG	From WOTS Zone Substation to 50 Baranduda Drive, Baranduda (Vitasoy production facility)	Entirely UG feeder
	WOTS25	Lat -36.14974 Long 146.86930	UG	Clarendon-Avondaleto Ballara Bowen, Ballara Drive, Wodonga	Capacitive management, UG feeder segment

Zone Substation	Feeder ID	GPS Coordinates	Construction	Location	Description
Moe (MOE)	MOE15	Lat -37.955385 Long 146.401597	UG	50 Depot Road, Rawson	UG network beyond Zero Sequence isolating transformer
Wodonga and Tallangatta (WOTS)	WOTS23	Lat -36.15642 Long 146.95084	UG	From WOTS Zone Substation to 50 Baranduda Drive, Baranduda (Vitasoy production facility)	Entirely UG feeder
	WOTS25	Lat -36.14974 Long 146.86930	UG	Clarendon-Avondaleto Ballara Bowen, Ballara Drive, Wodonga	Capacitive management, UG feeder segment

16 SCHEDULE OF REVISIONS

Revision	Date	Details of Change
1	15/6/2006	Document updated to reflect 2006-07 season requirements.
2	6/6/2007	Document updated to reflect 2007-08 season requirements.
3	9/6/2008	Document updated to reflect 2008-09 season requirements.
4	26/11/2008	Document updated to include statement in Sec 3.4 that in general terms during the declared fire season the network is operated as normal
5	30/6/2009	Document updated to reflect 2009-10 season requirements.
6	7/9/2009	Minor updates to reflect changes in responsibilities re asset inspection
7	30/6/2010	Document updated to reflect 2010-11 season requirements.
8	23/9/2010	Objective in Sec. 2.8 amended to reflect requirements in new Regulations
9	27/6/2011	Document updated to reflect 2011-12 season requirements and to update Asset Inspection Cycles in Section 2.1.
10	13/9/2011	Document updated to include comments from ESV
11	25/10/2011	Document updated to include further comments from ESV
12	3/1/2012	Section 3.4.3.3 updated to include changes to the operational settings of protective devices during periods of TFB and on Code Red Days
13	20/1/2012	Revisions to sec. 3.4.3.3 to reflect changes to OCR settings to occur manually on TFB & Code Red Days & Sec 3.4.3.1 to reflect revised supply restoration policy
14	16/2/2012	Revise section 2.1 'Training' to reflect ESV acceptance of asset inspection training course
15	29/6/2012	Major revision to BFM Plan – Remove detail not required under prescribed requirements of regulations
16	18/10/2012	Revision to accommodate changes to the regulations introduced 28/6/2012 that removed the term 'at risk'.

Revision	Date	Details of Change
17	07/12/2012	Revised sec 8.3.9 Enhanced Feeder Protection & Control and sec 11.2.3 A/R Suppression & Prot Setting Changes for application of revised FLCM. Sec 10.2 Asset Inspector Training revised to reflect ESV approval for linesman inspection activities
18	16/06/2013	Section 11.2 'TFB & Code Red Days' updated to reflect CEOT procedures DOP 10-10 & DOP 90-28. Sec 7 'Contacts' list updated. Table 4 Safety Program updated
19	18/09/2013	Amended section 8.2.1 & 13.6.1as requested by ESV - email dated 16/09/2013.
20	25/06/2014	Plan updated to reflect 2014-15 bushfire season requirements. Amended sections 8.2.1, 9.2, 10.1 & 15.1. Added sections 8.3.13 & 8.3.14.
21	22/07/2014	Amended 8.3.14.1 reflecting PRF reporting requirements. Added 15.6 PRF reporting template.
22 23	12/12/2016 11/01/2017	Include requirements to address amendments introduced 1 May 2016.Refer Appendix 15.1 which contains new regulations 7(1)(ha),(hb),(hc),(hd),(n)(vii) & 7(3) with reference to amended sections in Plan. Sec 8.3.10 & 11.2.3 updated to reflect application of AN140 FLCM to determine 'worst' and 'remaining' consequence areas. General review of strategies and programs from previous 2011-15 EDPR period. ESV request minor modification to sec 8.3.7 & 11.2.3. Sec 8.3.9.3 updated with REFCL contingent project application info and inclusion of appendix 5.
24	23/03/2017	Section 8.3.9.3, 'REFCL Implementation' and Appendix 5 high level scope of works amended for consistency with contingent project submission to AER.
25	29/03/2018	Updates to REFCL sections 8.3.9.3, 8.4.1, 11.3.2 and Appendix 5 and replacement of figure 8.3 to reflect current REFCL Program activities, compliance testing and operating modes. General updates to sections8.3.1,8.3.13, 8.4.2, 9.2, 12.2.1, 12.2.2 & 13.3 regarding program and indicator updates.
26	2/10/2019	Definition for covered conductor included. Update sec 8.2.1 & 10.1 with revised HBRA inspection & testing interval notified to ESV 17/10/18 and completion of accepted transition plan for LBRA poles to 71 month interval. Update sec 8.3.7 to include construction standards for codified areas. Figure 8-3 REFCL implementation updated.

Revision	Date	Details of Change
27	22/02/2021	Sec 7 'Contacts' updated. Table 8-3 updated with current REFCL deployment program New sec 8.3.9.4 REFCL Exempt Networks added to reflect application of ESV general exemption together with Appendix 6 which lists exempt network segments. Sec 8.3.9 & 11.2.3 updated to reflect change to protection sequences for TFB days in worst areas. Update sec 8.4.1 to reflect introduction of alternative REFCL provider. Table 9.1 updated to reflect ETB 005-2019. Sec 11.3.2 remove 'issue' number reference. Updated Appendix 5 to be 'REFCL Exemptions'.
28	24/11/2022	Administrative updates Sec 11 Operation & Maintenance plans in relation to Fire Danger Rating, Fire Behaviour Index under the new Australian Fire Danger Rating System which came into effect 1 September 2022.
29 (Not accepted by Energy Safe)	25/09/2023	Updates to Section 9.1 & Section 8.2 - overhead asset inspection cycle in HBRA and Limited Life pole inspection cycle in all areas changed from 37-month interval to nominal 30 months, and the addition of WoodScan technology, both at the ESV request (s109 notice 9 June 2023). General review vs. the Electricity Safety (Bushfire Mitigation) Regulations 2023 (remade 16 June 2023) – refreshed cross reference of the Plan to the Regulations. Updated REFCL related sections to reflect the completion status of REFCL deployment.
30 (Not accepted by Energy Safe)	15/08/2024	Request from Energy Safe to confine updates to S109 notice (9 June 2023) and Court Order (2 July 2024) with associated Energy Safe correspondence. • Control table, Forword & Sec 7 updated responsible persons • Corrected regulatory references • Update to Section 8.2.1 'Scheduled Pole Inspections' • Insertion of new Section 8.2.2 ' WoodScan Survey' • Update to 'Overhead Line Inspection' section of Figure 9-1 – General BFM Maintenance Preventative Strategies Program • Insertion of new Section 9.1.1 'Asset inspection Cycle Change & Transition Plan' • Update to Section 10.1 'Inspection Plan' • Update Appendix 1 – compliance table
31	28/04/2024	Revised per Energy Safe advice dated 5 March 2025 of its assessment outcome of AusNet submitted revision v.30 • Cyclic inspection interval specified to 30 months plus one month float for all supply network assets within HBRA in Section 8.2.1, 9.1.1, 10.1 and Figure 9-1 • Cyclic inspection interval specified to 30 months plus one month float for all Limited Life poles in Figure 9-1 • Reinstated specific priority timeframes for BFM critical maintenance by types of defects as per version 28

Figure 16-1 Schedule of Revisions