

# Bushfire Mitigation Plan 2019 - 2024

**Electricity Safety (Bushfire Mitigation) Regulations 2013**

## **Powercor**



December 9, 2019

Revision 6

Administrator: Network Safety and Bushfire Mitigation Manager

Document No: 05-M810

# Bushfire Mitigation Plan 2019 - 2024

## Powercor

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## Document Revision History

Revision No.	Revision Summary	Reviewer/ Approver	Date
1	<ul style="list-style-type: none"> <li>Plan submitted to ESV</li> </ul>	Bushfire Mitigation Manager	27 June 2014
2	<ul style="list-style-type: none"> <li>Plan amended to include ESV Direction relating to Powerline Replacement projects (<b>Section 8.5</b>).</li> <li>Plan amended to include information relating to auditor training and qualification requirements (<b>Section 12.1</b>).</li> <li>Plan amended to include information relating to ESV Direction regarding SWER ACR replacement/installation program as per 2012-2013 BFM Plan (<b>Section 8.5</b>).</li> <li>Plan amended to include the requirements Electricity Safety (Bushfire Mitigation) Amendment Regulations 2015 dated 23 June 2015.</li> <li>Plan amended to include information relating to vegetation auditing (<b>Section 12.1</b>).</li> <li>Plan amended to include information relating to the trial installation of Rapid Earth Fault Current Limiters (REFCLs) to enable Powercor to meet the requirements of the proposed Electricity Safety Further Amendment (Bushfire Mitigation) Regulations 2015 (<b>Section 8.8</b>)</li> <li>Plan amended to include an update on the SWER ACR Replacement/Installation Program (<b>Section 8.5</b>).</li> <li>Plan amended to remove reference to the Conductor Tie Performance Study (<b>Section 8.8</b>).</li> <li>Plan amended to include planned commission dates for the trial installation of Rapid Earth Fault Current Limiters (REFCLs) at the Gisborne and Woodend Zone Substations (<b>Section 8.8</b>).</li> <li>Plan amended to include the new asset inspection training requirements (<b>Section 8.10</b>).</li> <li>Plan amended to include information relating to the prioritisation of SWER ACR replacements and also information added regarding SWER ACR settings on TFB Days (<b>Section 8.5</b>).</li> </ul>	Bushfire Mitigation Manager	10 July 2014 10 July 2014 3 September 2015 3 September 2015 3 September 2015 17 September 2015 18 December 2015 18 December 2015 18 December 2015 18 December 2015 4 March 2016
3	<ul style="list-style-type: none"> <li>Plan amended to include the requirements of the Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016 relating to Rapid Earth Fault Current Limiters (REFCLs), Electric Line Construction Areas and SWER ACRs. (<b>Section 6.5</b>)</li> <li>Additional information regarding ACR protection application on TFB Days (<b>Section 6.6</b>)</li> <li>Expanded descriptions in <b>Section 6.1.1</b> – Training, and <b>Section 8</b> – Fire Investigation</li> <li>Added new milestone for vegetation reporting in <b>Section 9.4</b> – BFM Milestones and <b>Appendix C</b></li> <li>Amended <b>Appendix A</b> TFB Day Action Plan, revised re-energisation of supply requirements</li> <li>Removed <b>Appendix B</b> – Electric Line Clearance (Vegetation) Management Plan</li> <li><b>Rev 3.1</b> – minor amendment to <b>Section 6.5</b>, additional information regarding the intended application of REFCL operating modes</li> </ul>	Head of Network Compliance	5 December 2016
4	<ul style="list-style-type: none"> <li>Added <b>Section 6.18</b> HVABC replacement program and <b>Appendix K</b> listing the project sites</li> <li>Amended <b>Section 6.5.3</b> to include further information about Fuse-savers for the SWER ACR replacement program</li> <li>Amended <b>Section 6.5.1 Table 1</b> to include the bring-forward of EHK zone substation into REFCL tranche 1</li> </ul>	Head of Network Compliance	30 March 2017
5	<ul style="list-style-type: none"> <li><b>Section 6.5.1</b> REFCLs – additional text added regarding operating modes and annual compliance testing. REFCL program updated to reflect Terang and Ararat into Tranche 2 and Geelong to Tranche 3</li> </ul>	Head of Network Compliance	20 Dec 2018

	<ul style="list-style-type: none"> <li>• <b>Section 6.5.2</b> Notes relating to the construction solutions in the ELCA's have been added</li> <li>• <b>Section 6.5.4</b> Annual compliance report to be provided to ESV before the 1st August each year, pertaining to the Electricity Safety Act sections 120M, 120N, 120O and 120P (Bushfire Mitigation Civil Penalties Scheme)</li> <li>• <b>Section 6.6</b> Revised staging of SWER ACRs, HV Conductor Clearances, and ARVDs. ARVD direction concludes in 2018.</li> <li>• <b>Section 6.9</b> New technologies and initiatives – added the development of the Bushfire Risk Reduction Strategy which includes examples such as the IND-T trial on SWER lines and the bushfire risk modelling</li> <li>• <b>Section 6.15</b> Total Fire Ban Days – relocated and updated enhanced protection and suppression settings information from Section 6.6</li> <li>• <b>Section 9.4</b> BFM milestones – removed the annual CFA fire hazard mapping project and Senior Management Program reviews. Added submission of annual compliance report to ESV and annual internal compliance audit of the Bushfire Mitigation Plan</li> <li>• <b>Section 10.1</b> Audits – addition of a compliance audit pertaining to the Electricity Safety Act sections 120M, 120N, 120O and 120P (Bushfire Mitigation Civil Penalties Scheme)</li> <li>• <b>Appendix A</b> - TFB Day Action Plan updated</li> <li>• <b>Appendix J</b> - Reference Documents added</li> </ul>		
6	<ul style="list-style-type: none"> <li>• <b>Section 6</b> Updated Asset Management overview incl. latest asset inspection terminology and asset inspection and defect management timelines.</li> <li>• <b>Section 6.6.1</b> REFCL sections updated</li> <li>• <b>Section 6.7</b> Updates provided on each of the directions</li> <li>• <b>Section 6.8</b> New section added. ESV exemptions</li> <li>• <b>Section 6.12</b> New section added. Bushfire asset replacement and new technology implementation programs</li> <li>• <b>Section 6.21</b> HVABC replacement program completed</li> <li>• <b>Appendix A - TFB Day Action Plan</b> Updated to reflect revised personnel and role descriptions and new <b>section 5.12</b> added – Protocol for bypassing REFCLs on TFB days.</li> </ul>	Network Safety & Bushfire Mitigation Manager	9 December 2019

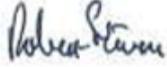
# 1 PLAN INTRODUCTION

## 1.1 CONTACTS & APPROVALS

Responsibility	Title	Address	Contact Details
<b>BMP Responsible Organisation</b>	Powercor Australia Ltd.	40 Market Street Melbourne, 3000 Victoria	Phone: 13 22 06
<b>BMP Preparation</b>	Senior Bushfire Mitigation Advisor	40 Market Street Melbourne, 3000 Victoria	Phone: 13 22 06
<b>BMP Carrying out</b>	Network Safety & Bushfire Mitigation Manager	40 Market Street Melbourne, 3000 Victoria	Phone: 13 22 06
<b>BMP Emergency Contact</b>			Phone: 13 24 12 (24 x 7 emergencies and faults contact number for members of the public)

**Prepared By**

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**Date** 9/12/19

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**Date** 9/12/19

## 1.2 PLAN DEFINITIONS

**Act:** Electricity Safety Act 1998.

**Fire Danger Period:** a period declared under section 4 of the *Country Fire Authority Act 1958* to be a fire danger period.

**Total Fire Ban Day:** a day that has been declared to be a day of total fire ban under section 40(1) of the *Country Fire Authority Act 1958*.

For other definitions refer to the Act, Regulations and Code.

## 1.3 REGULATION COMPLIANCE INFORMATION

The following table provides a cross reference of the sections of the Powercor Bushfire Mitigation Plan (BMP), to the specific items required in Regulation 7 of the “Electricity Safety (Bushfire Mitigation) Regulations 2013”.

Reg	7 - Prescribed particulars for bushfire mitigation plans—major electricity companies.	Powercor Plan Reference
7(1)(a)	the name, address and telephone number of the major electricity company;	Contacts & Approvals
7(1)(b)	the position, address and telephone number of the person who was responsible for the preparation of the plan;	Contacts & Approvals
7(1)(c)	the position, address and telephone number of the persons who are responsible for carrying out the plan;	Contacts & Approvals
7(1)(d)	the 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;	Contacts & Approvals
7(1)(da)	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;	Contacts & Approvals
7(1)(e)	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)(f)	the objectives of the plan to achieve the mitigation of fire danger arising from the major electricity company’s supply network;	Section 3.2
7(1)(g)	a description, map or plan of the land to which the bushfire mitigation plan applies;	Section 4.1, Section 4.3
7(1)(h)	the preventative strategies and programs to be adopted by the major electricity company to minimise the risk of the major electricity company's supply networks starting fires;	Section 6 to 6.21

Reg	7 - Prescribed particulars for bushfire mitigation plans—major electricity companies.	Powercor <i>Plan</i> Reference
7(1)(ha)	<p>details of the preventative strategies and programs referred to in paragraph (h) (including details in relation to timing and location) by which the major electricity company will ensure that—</p> <ul style="list-style-type: none"> <li>(i) in its supply network, each polyphase electric line originating from a selected zone substation has the required capacity; and</li> <li>(ii) on and from 1 May 2023, in its supply network, each polyphase electric line originating from every zone substation specified in Schedule 2 has the required capacity;</li> </ul>	Section 6.6
7(1)(hb)	<p>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 (ha);</p>	Section 6.6
7(1)(hc)	<p>details of the preventative strategies and programs referred to in paragraph (h) (including details in relation to timing and location) by which the major electricity company will ensure that, on and from 1 May 2016, within an electric line construction area, each electric line with a nominal 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;</p>	Section 6.6
7(1)(hd)	<p>details of the processes and procedures by which the major electricity company will ensure that, before 1 May 2023, the major electricity company has installed an Automatic Circuit Recloser in relation to each SWER line in its supply network;</p>	Section 6.6
7(1)(i)	<p>a plan for inspection that ensures that –</p> <ul style="list-style-type: none"> <li>(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.</li> <li>(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.</li> </ul>	Section 6.2
7(1)(j)	<p>details of the processes and procedures for ensuring that each person who is assigned to carry out inspections referred to in paragraph (i) and of private electric lines has satisfactorily completed a training course approved by Energy Safe Victoria and is competent to carry out such inspections;</p>	Section 6.14

Reg	7 - Prescribed particulars for bushfire mitigation plans—major electricity companies.	Powercor Plan Reference
<b>7(1)(k)</b>	details of the processes and procedures for ensuring that persons (other than persons referred to in paragraph (j) who carry out or will carry out functions under the plan are competent to do so;	<b>Section 6.14</b>
<b>7(1)(l)</b>	the operation and maintenance plans for the major electricity company's supply network— (i) in the event of a fire (ii) during a total fire ban day (iii) during a fire danger period	<b>Section 6.15 to Section 6.20</b>
<b>7(1)(m)</b>	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;	<b>Section 8 Section 9.2 Section 9.3</b>
<b>7(1)(n)</b>	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) (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, report to Energy Safe Victoria the results of testing undertaken in that year in accordance with regulation 7(1)(hb);	<b>Section 10 Section 10 Section 11 Section 11 Section 10 Section 10 Section 6.6</b>
<b>7(1)(o)</b>	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;	<b>Section 6.15</b>
<b>7(1)(p)</b>	details of processes and procedures for enhancing public awareness of; (i) the responsibilities of the owners of private overhead electric lines that are above the surface of the land in relation to maintenance and mitigation of bushfire danger; (ii) the obligation of the major electricity company to inspect private overhead	<b>Section 6.16  Section 6.10</b>



## 2 Introduction

### 2.1 LEGISLATION

Section 113A (1) of the Electricity Safety Act 1998 (incorporating amendments as at 1 January 2012) requires that a major electricity company must prepare and submit to Energy Safe Victoria, for acceptance under this Division, a plan for the company's proposals for mitigation of bushfire in relation to the company's supply network at the end of each period of 5 years commencing on the later of-

1. the date when the accepted bushfire mitigation plan is first accepted under this Division; or
2. the date of the most recent acceptance of a revision of the accepted Bushfire Mitigation Plan submitted under this Division.

In accordance with the Electricity Safety (Bushfire Mitigation) Regulations 2013 this Bushfire Mitigation Plan (BMP) provides the prescribed particulars as specified in Regulation 7.

This plan can be found on Powercor's Intranet site by following this path:

***Home > Our Organisation > CitiPower and Powercor > Electricity Networks > Network Compliance > Bushfire Mitigation >Key Documents>PAL- Bushfire Mitigation Plan***

A copy of the current accepted bushfire mitigation plan will be available for inspection-

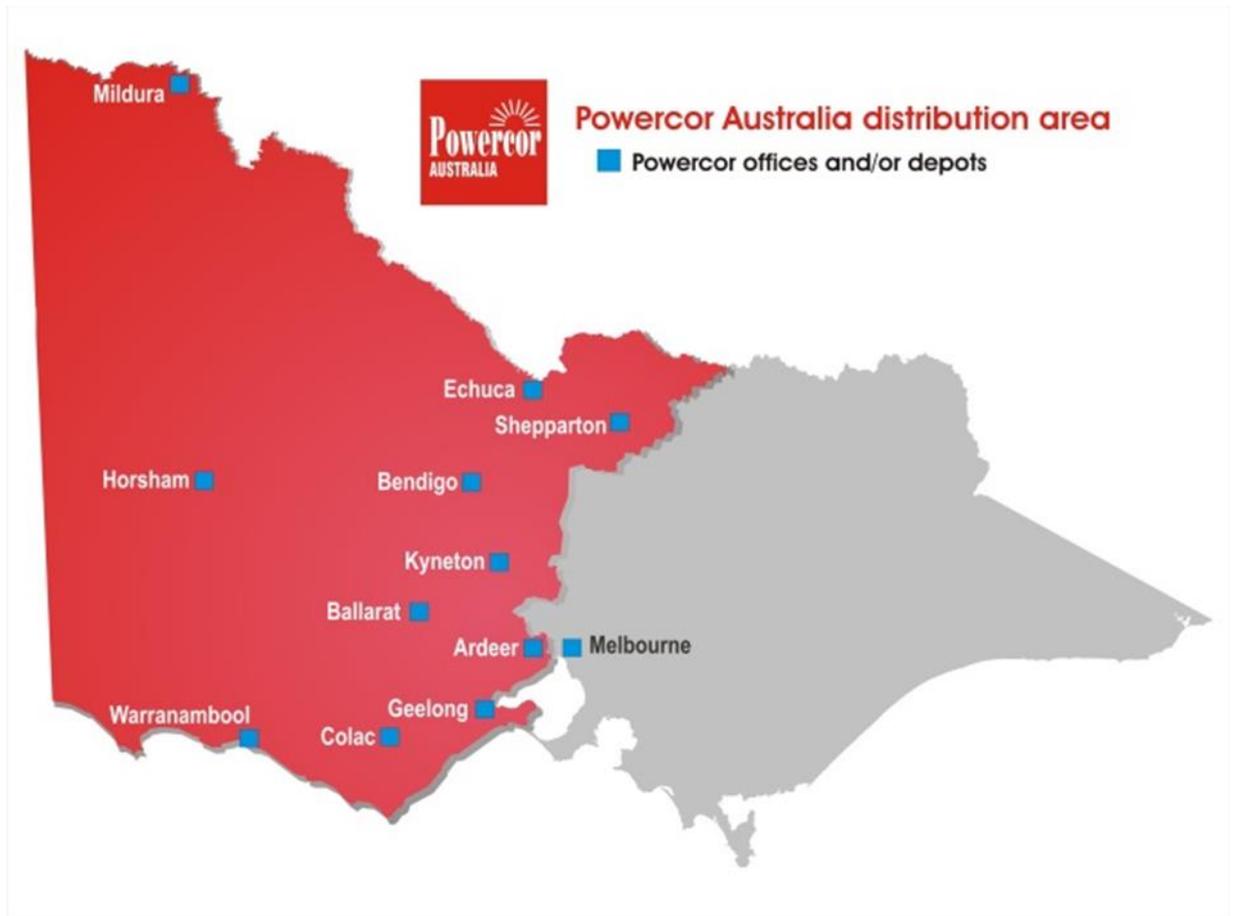
- (a) on the company's Internet site; and
- (b) at the company's principal office in the State during ordinary business hours.

This Bushfire Mitigation Plan is a living document and will evolve as the fire danger period approaches. Appendices to this document will be reviewed and additional information will be added to the appendices as it becomes available.

### 2.2 POWERCOR AUSTRALIA

Powercor Australia operates the largest electricity distribution network in Victoria, servicing customers in central and western Victoria, as well as Melbourne's outer western suburbs. Statistics regarding the Powercor distribution network are shown below.

Attribute	Statistic
Network area	145,651 square kilometres
Underground lines	11.60%
Number of poles (all poles)	547,567
Number of zone substation transformers	140
Number of distribution substation transformers	82,780
Total number of customers	750,248
Customer density	5.15 per square kilometre
Network availability	99.97%



### 3 BFM Policy & Objectives

#### 3.1 POLICY

To minimise the risk of fire starts from its electrical assets as far as reasonably practicable by complying with legislative and regulatory requirements, whilst allowing flexibility within the business to encourage innovation, continuous improvement and the efficient use of resources.

#### 3.2 OBJECTIVES

The objectives of this BMP are to:

- Minimise the risk of fire starts from electrical assets
- achieve compliance with the relevant legislative and regulatory requirements while providing flexibility within the business to encourage innovation, continuous improvement and the effective use of resources
- define the companies approach to the management of the risk of bushfires caused by electricity assets
- reference the policies and procedures relating to bushfire mitigation activities into one document
- demonstrate a high level of commitment to meeting bushfire mitigation responsibilities

## 4 Scope

Powercor's bushfire mitigation framework is illustrated below and demonstrates a comprehensive and whole of business approach to what is the biggest risk in the business. The proactive planning and scheduling of this program is based principally on a whole of asset life approach that includes design, construction, operation, maintenance and removal. The annual governance systems of vegetation and asset inspection and maintenance activities are supported by a regime of reporting and auditing.

The continuous improvement elements encompass a large body of proactive capital (including VBRC) works, trialing and adoption of new technologies, and our response to audit outcomes.

The response aspects of the plan include our operational processes to faults and TFB days, asset failure investigations, and fire start reporting.

The framework also has a significant aspect of proactive stakeholder management, including POEL owners, Councils (vegetation management), other agencies, specific community messaging and our ongoing customer interfacing



This BMP applies to assets that could cause fire ignition in all areas of Powercor's supply network. Electricity networks have been a source of fire ignition since their construction and consequently a considerable amount of investigation has been and continues to be undertaken into the causes to enable preventative actions to be taken.

The main causes of fire ignition are:

- Surface contamination of insulators, combined with moisture, resulting in electrical tracking (leading to pole/cross arm fires)
- Failure or malfunction of network devices such as Surge Arresters and Expulsion Drop out (EDO) fuses
- Contact between vegetation and the electricity network
- Bird/animal or 3<sup>rd</sup> party contact with electricity assets
- Failure of line hardware (electrical and mechanical)

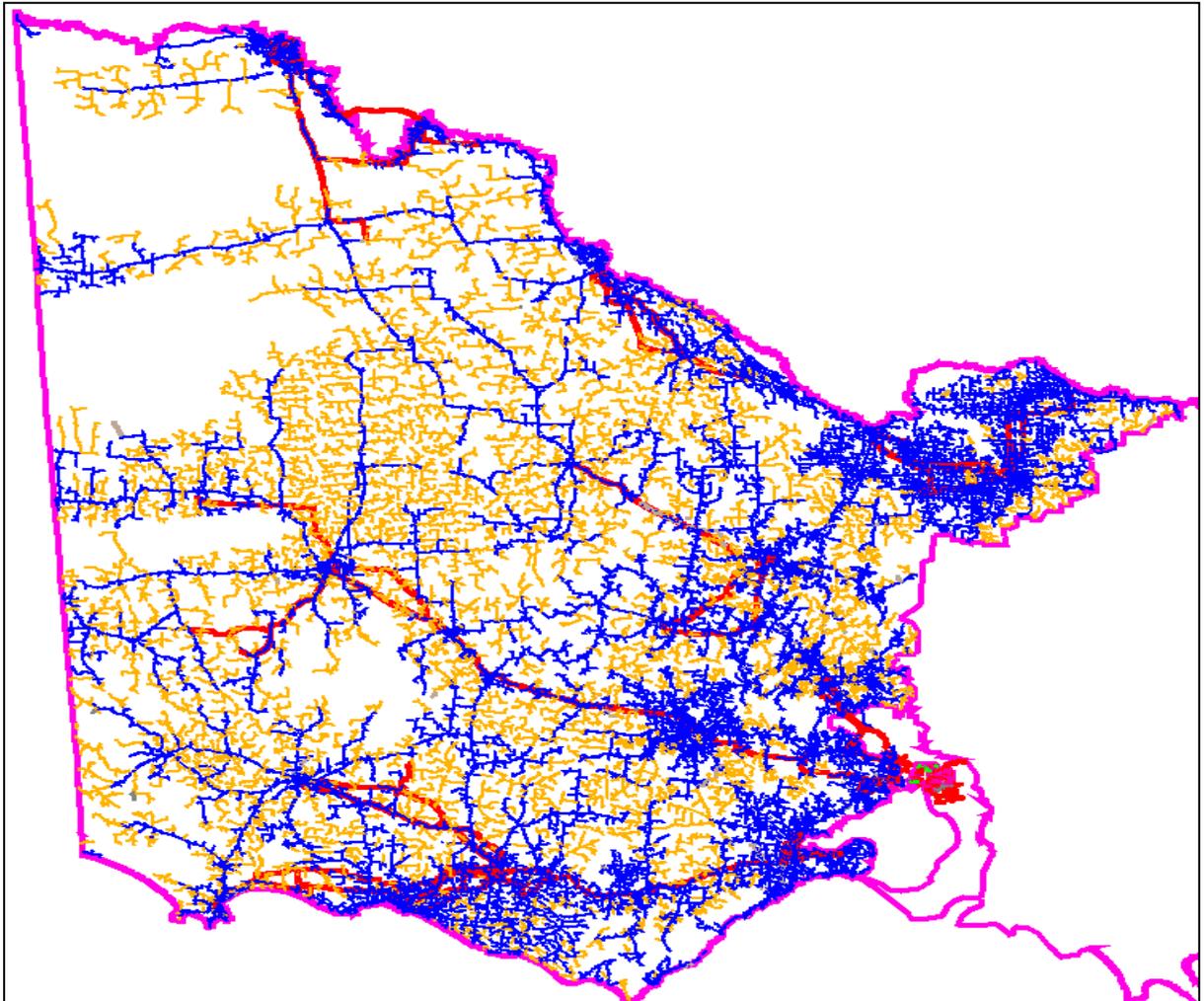
- Conductor failures

This BMP makes reference to other plans, manuals, standards, policies, procedures and work instructions which, when combined with this plan, cover all of the activities that contribute to the reduction of bushfire risk.

Other key documents include:

- The TFB Day Action Plan - refer Appendix A
- The Electric Line Clearance (Vegetation) Management Plan
- The Asset Management Framework & associated Plans
- The Event Command Organisation (ECO) Manual
- Electricity Safety Management Scheme
- The Asset Inspection Manual
- Technical Standards (covering design & construction of assets)
- Maintenance Policies
- The various Manuals, Procedures, Guidelines and Work Instructions covering BFM related activities
- Technical Bulletins

#### 4.1 ELECTRICAL NETWORK MAP

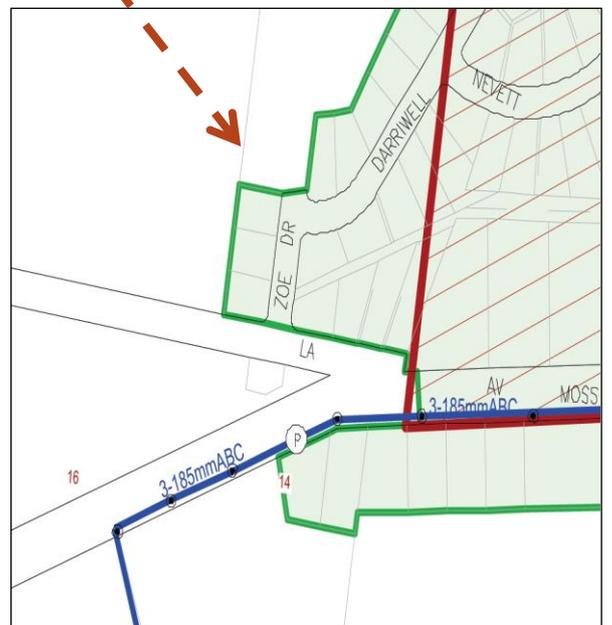
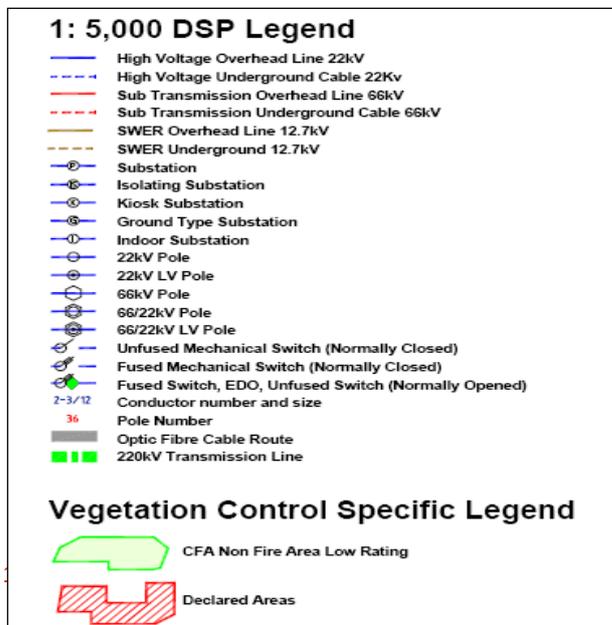
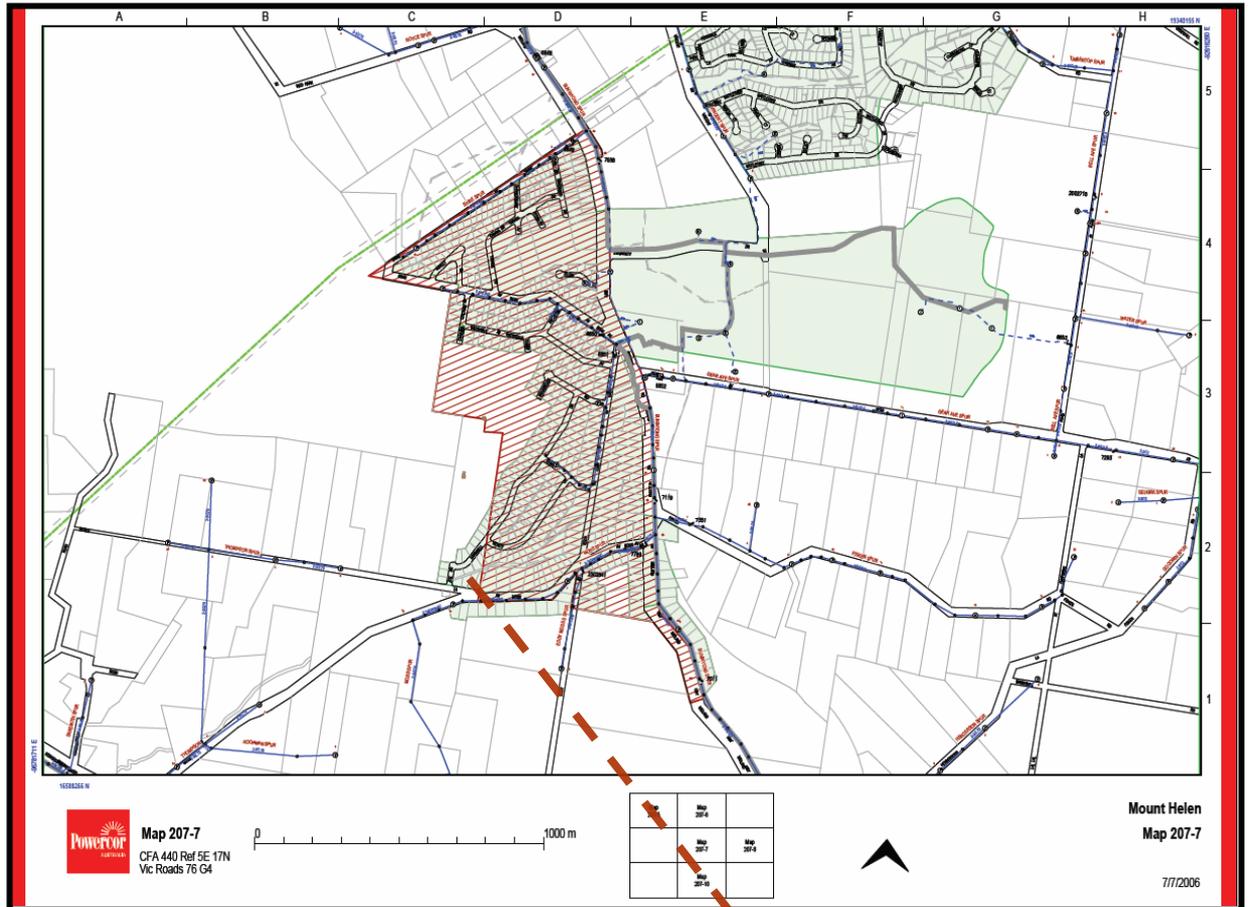


The Powercor HV Overhead Network (displayed above) is colour coded as follows:

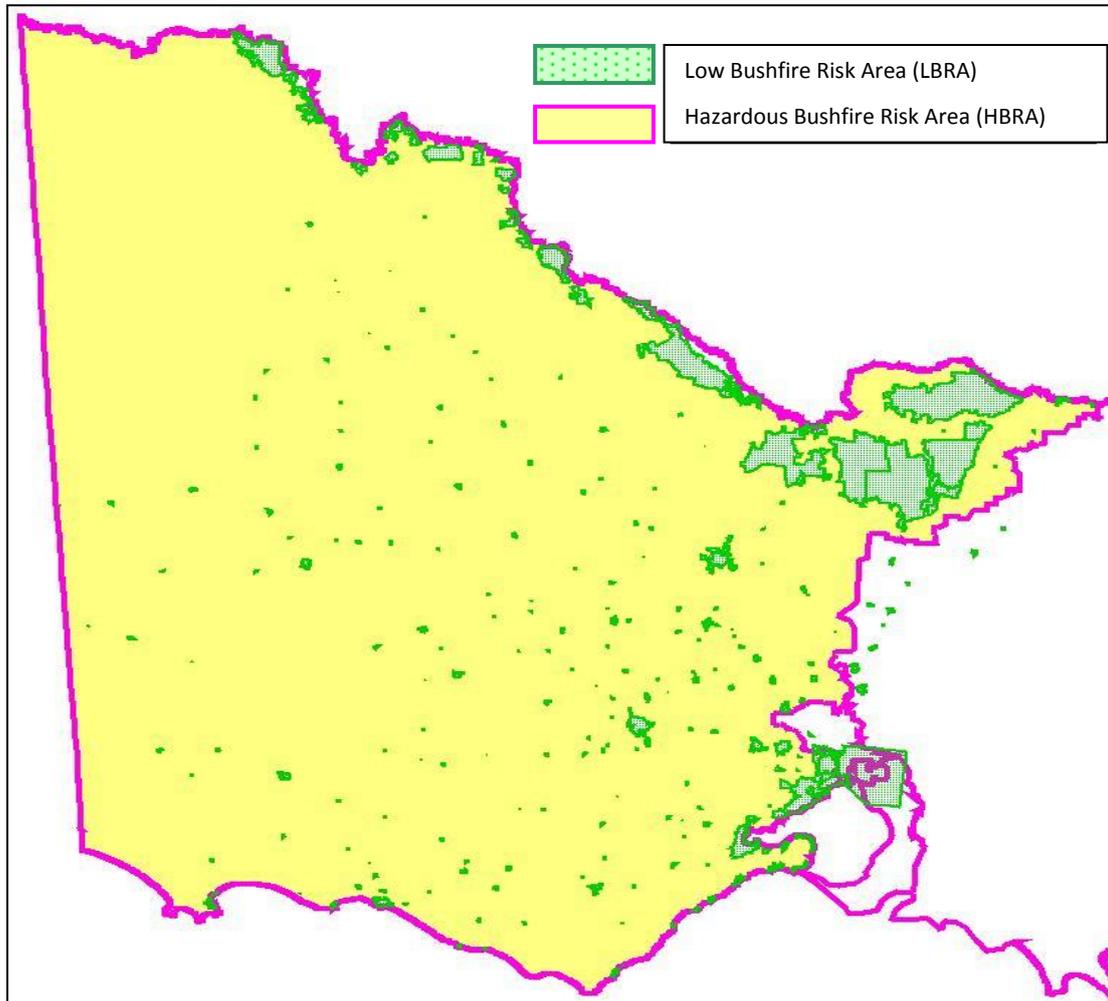
- 66kV Sub-transmission Lines
- 22kV 3 Phase and 1 Phase lines
- 12.7kV SWER Lines

To maintain clarity the LV Overhead network has not been shown. Full network details are available from Powercor's Graphical Information System (GIS).

## 4.2 GIS BOOK SAMPLE



### 4.3 BUSHFIRE RISKS AREAS



Bushfire Risk Areas are updated as part of the CFA Fire Hazard Mapping Project and may change as areas are reviewed across the state.

Approximately 51% of Powercor assets are located in Hazardous Bushfire Risk areas (percentage based on pole population).

## 5 Management Structure

Powercor has a formal management structure for the implementation and control of BFM related activities. This structure has clearly assigned authorities and responsibilities associated with each position. It takes into account the inter-relationships between those that manage, perform, record, verify and report bushfire mitigation activities and has been set up to maintain independence of reporting and monitoring tasks. External to the BFM management structure are the Audit Services group which annually audit and report on BFM performance and compliance.

A copy of the current Powercor Management Structure is available on the Company's Intranet site.

## 6 Policies and Strategies

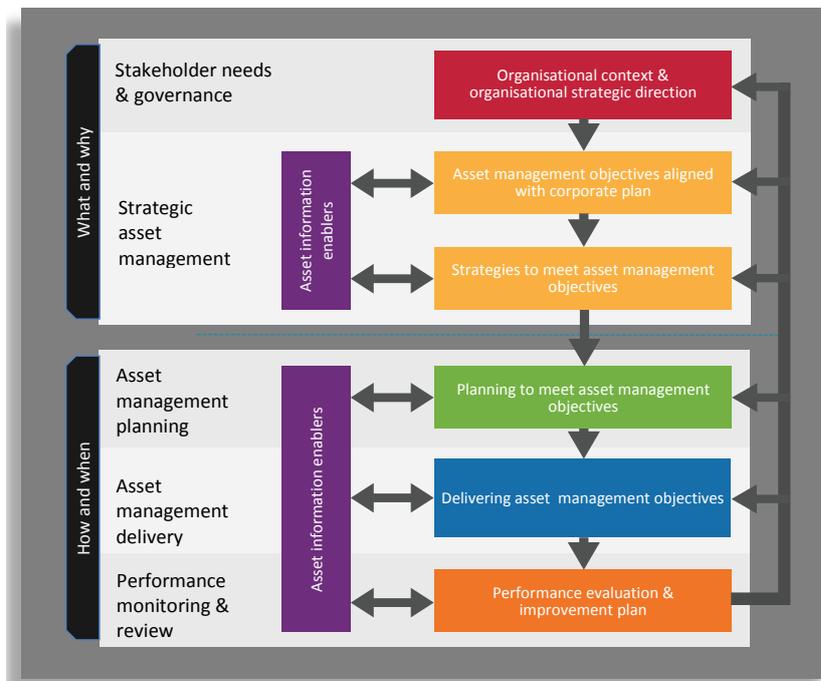
Powercor uses a number of strategies, plans, policies and standards to achieve its' Asset Management objectives. The principle documents for ongoing asset management will be the Network Asset Management Plans, Specific focus plans/strategies and policies, standards, specifications and guidelines.

### 6.1 OVERVIEW OF THE ASSET MANAGEMENT SYSTEM

The Powercor asset management system reflects the structure aligned with ISO 55001. It is structured into five levels in simplified form as shown in figure 3:

- Level 1: Stakeholder needs and governance;
- Level 2: Asset management objectives aligned with the Powercor five strategic pillars;
- Level 3: Asset management planning;
- Level 4: Asset management delivery; and
- Level 5: Performance monitoring and review.

Levels 1 and 2 describe 'What' asset management strategies and objectives are to be targeted and provide details regarding 'Why' these are required. Level 3 describes the approach taken to plan and budget for the delivery of the asset management activities, while level 4 describes 'how' and 'when' these activities are delivered to meet the strategies and objectives. Level 5 describes Powercor's approach to performance monitoring and review of the asset management system.



The relationship between the various strategy and planning documents in Powercor's asset management system is shown in figure 4.



Powercor has developed and implemented a number of policies and procedures across a broad range of areas to minimise the risk of fire ignition starting from its supply network. These areas include:

- Bushfire Mitigation
- Asset Management
- Incident Reporting & Investigation
- Private Overhead Electric Lines
- Environmental
- Information Technology
- Purchasing and Procurement
- Contract and Contractor Management

The specific policies, strategies and procedures related to BFM activities are described below.

## 6.2 MONITORING ASSET CONDITION

Preventative maintenance strategies have been created for all of Powercor’s zone substations, sub-transmission and distribution assets. These strategies were developed from Reliability Centred Maintenance (RCM II) methodologies and involve undertaking on-condition tasks based on a program of condition monitoring of the electrical network assets. The RCM rules are configured in Powercor’s Asset Management Enterprise System, called SAP, which automatically generates time based work orders for inspection and maintenance planning.

Asset maintenance policies are developed, reviewed and implemented in accordance with:

- **Procedure 18-05-P0003 - Asset Maintenance Policy and Asset Management Plan Review and Development**
- **Document JEQA4UJ443MT-173-116- Electricity Safety Management Scheme**

These documents outline how Powercor identifies needs, develops and manages policies and provides a systematic process through the identification of strategic, operational and program/project level risks to;

- Determine accountability for risks;
- Provide an assessment of controls and the control environment;
- Analyse and evaluate risks; and
- Manage the risks to as low as reasonably practicable levels.

### Asset Inspection Cycle

Inspection of poles is carried out in a dedicated program conducted over the following cycles (referred to as cyclic inspections):

Included poles	Type of inspection	Cycle
Serviceable poles in HBRA	Above ground inspection	2.5 years +/- one month
All serviceable poles	Full inspection	5 years +/- one month
AC serviceable poles <sup>①</sup>	Above ground inspection	1 year +/- six months
AC serviceable poles <sup>①</sup>	Full Inspection	2 years +/- six months

① Added Controls Serviceable Poles (AC Serviceable Poles) are referred to as Limited Life poles in SAP records.

### Definition of inspection types:

**Full Inspection** - Full inspection of pole and pole top assets in accordance with:

- **05-C001-D390 – Network Asset Maintenance Policy for Inspection of poles.**

**Pole Above Ground Inspection** – Visual inspection of pole and pole top assets in accordance with:

- **05-C001-D390 – Network Asset Maintenance Policy for Inspection of poles.**

**Note:** This inspection excludes excavation, treatment, and pole assessment at or below ground line. Both inspection types include the inspection of electrical assets between poles.

Operational instructions for the inspection, testing and assessment of assets are contained in:

- **Manual 05 - M450 - Asset Inspection Manual**

This manual describes the various types of electrical assets and the observations or tests necessary to identify and assess their condition. It also gives a detailed description of items that need to be identified for approved replacement or modification programs. The manual sets out criteria for categorising the urgency for remedial maintenance actions and the reporting and information recording requirements.

Due to access difficulties associated with the inspection of poles located in inaccessible locations these inspections are conducted in accordance with:

- **Procedure 18–20–P0004 – Inaccessible Asset**

The Asset Inspection Officer controls the program of power line inspection in accordance with Powercor’s policies using maintenance plans established within SAP. Each maintenance plan covers all of the poles within a specific electrically isolatable section of the network. Maintenance plans are managed in accordance with:

- **Procedure 18–20–P0002 –Asset Inspection**

When SAP transaction “Date Monitoring” is run, pole inspection orders (PINS) are created in accordance with the scheduled dates specified in the maintenance plans. These work orders are electronically transferred to the Field Mobile Computing (FMC) system, reviewed by the Asset Inspection Officer and released to the Asset Inspection contractor. FMC is an interface application, linked to SAP and GIS, that prepares data for dispatch to the Asset Inspection contractor. Individual work orders are created by the Asset Inspection contractor and downloaded to individual asset inspectors.

Asset Inspectors carry out the inspections and enter the results into a Portable Data Assistant (PDA). After inspection the “as found” data, in the PDA, is uploaded to FMC via remote data transfer connection. An overnight batch run in SAP automatically updates the equipment details as per the uploaded data and raises Notifications for all defects identified. Each Notification contains details of the defect located on a specific pole.

The Asset Inspection Officer is responsible for preparation of the asset inspection program and monitoring of the performance of the contractor in adhering to the program. This is performed with the use of exception reporting to monitor variations from policy. A daily automated report is generated and sent to key stakeholders across the business.

### 6.2.1 Thermal and Corona Imaging

Thermal imaging inspections are undertaken in accordance with:

- **Policy No. 05 - C001.D - 570 - Thermovision Policy**

Corona imaging inspections are undertaken in accordance with:

- **Guideline 18-20-G0001 - Corona Camera Application Guideline**

The thermal and corona inspection policies/guidelines stipulate the required inspection schedules and repair timeframes.

### 6.2.2 SWER Earths

This inspection program involves the testing of Single Wire Earth Return (SWER) isolating substations and distribution substations.

These inspections are carried out in accordance:

- **Policy No. 05 - C001.D - 291 - SWER Isolating Transformer Earthing Systems**
- **Policy No. 05 - C001.D - 292 - SWER Distribution Transformer Earthing Systems**

### 6.3 PRIORITY CLASSIFICATIONS

Asset defects identified by our inspection program or are internally/externally reported are assessed for their associated risk and prioritised for remedial action.

Any report of a network defect will be managed in accordance with:

- **Policy No 05 - C001.A - 025 - Priority Policy**

This policy sets out the criteria for classification of defects as shown in the table below.

Allocation	Symbol	Allocated to items assessed to be at risk of failure within the following timeframes	Need to be actioned within
Priority 1	P1	0 – 42 days	24 hours
Fault Follow Up 14 Days	FFU14	> 14 days	14 days
Fault Follow Up 28 Days	FFU28	> 28 days	28 days
Priority 42	P42	42 days - 32 weeks	42 days
Priority 2	P2	32 weeks – 3 years	32 weeks
Priority 3	P3	> 3 years	3 years
Priority Opportunistic	POPP	Not applicable	No set timeframe – actioned on an opportunity basis
Priority Notification for Information	PN	Not applicable	No set timeframe - information record only

*Extract from Priority Policy (05-C001.A-025) Issue 4.4*

### 6.4 REMEDIAL MAINTENANCE

Powercor’s maintenance programs are generated from a number of different sources, the main one being the asset inspection program (refer **Section 6.1**).

Maintenance can also be identified from the following:

- Reports from employees or contractors
- Customer calls
- Line Condition Observations
- BFM Vegetation Inspections/Audits
- The “Report It” Application

Refer **Section 10.1** for more information on audits.

### **Defect Management:**

Maintenance works identified through the inspection program are issued for remediation. Resources are scheduled to match the needs of the issued projects in order to achieve the required response times.

### **Faults/Fault Follow-up:**

Repairs to defects identified through the Network Faults/Outage process, including temporary repairs are managed in accordance with:

- **Procedure 07- 30 – P0013 - Manage Network Faults**
- **Procedure 07- 20 - G0013 – Fault follow-up & Repair**

### **Audits/Observations:**

Asset defects identified during audits/observations are communicated in accordance with the particular audit process.

### **Non Cyclic Maintenance:**

Maintenance found out of cycle is reported using the “Report It” Application.

## **6.5 ASSET REPLACEMENT/MODIFICATION**

Powercor has a number of specific BFM related policies that deal with the replacement and modification of Powercor assets. These include:

- Brown EDO fuse mounts more than 30 years old
- Unacceptable types of surge diverters
- Black or brown EDO fuse tubes
- Unacceptable types of bird covers
- Fitting of LV spreaders
- Replacement or reinforcement of unserviceable poles
- Replacement of deteriorated cross-arms
- Conductor replacement
- Surveys and rectification of HV conductor clearance breaches, both at the pole-top and mid-span
- SWER ACR’s

These activities are carried out in accordance with:

- **Policy No. 05 - C001.D - 320 - High Voltage Fuses**
- **Policy No. 05 - C001.D - 540 - Distribution Surge Arresters**
- **Policy No. 05 - C001.D - 330 - Insulators, Associated Hardware & Bird Covers**
- **Policy No. 05 - C001.D - 255 - Low Voltage Spreaders**
- **Policy No. 05 - C001.D - 392 - Management of Unserviceable Poles**
- **Policy No. 05 - C001.D - 280 - Cross Arms**
- **Policy No. 05 - C001.D - 398 - Permanent Reinforcing of Wood Poles**
- **Policy No. 05 - C001.D - 251 - Bare Conductor Policy**
- **Document No. - 01 - 00 - M0020 – Overhead Conductors Asset Management Plan**

In addition to these, Powercor is progressively replacing the aged and slow operating electromechanical feeder protection relays at Zone Substations. The new relays have faster operating times which has the benefit of reducing the fault clearance time and reducing the fault energy supplied.

## 6.6 ELECTRICITY SAFETY (BUSHFIRE MITIGATION) AMENDED REGULATIONS 2016

This section describes how Powercor complies with the amended Electricity Safety (Bushfire Mitigation) Regulations 2013, of 1 May 2016, specifically the obligations regarding:

- Rapid Earth Fault Current Limiters (REFCLs);
- Single Wire Earth Return (SWER) Automatic Circuit Reclosers (ACRs); and
- Electric Line Construction Areas.

### 6.6.1 Rapid Earth Fault Current Limiters

To minimize the risk of the electricity network starting fires, Powercor will install Rapid Earth Fault Current Limiters (REFCLs) in accordance with the amended regulations.

#### REFCL Installation

Powercor will install REFCLs at 22 zone sub-stations with a program for delivery over three tranches as shown in table 1 below. The three tranches will ensure sufficient points are achieved by each of the tranche milestone dates, as defined in regulation 7(3) of the amended regulations. Each polyphase line originating from the zone substations will also meet *required capacity*, by the required date, as defined in clause 5 of the amended regulations.

**Table 1 – REFCL installation program**

Count	Tranche 1				Tranche 2				Tranche 3			
	Station	Actual Install	Required Capacity	Points	Station	Planned Install <sup>[1]</sup>	Required Capacity	Points	Station	Planned Install <sup>[1]</sup>	Required Capacity	Points
1	Gisborne	Apr-17	Aug-18	3	Ararat	Nov-19	Dec-20	1	Corio	Nov-22	Dec-22	1
2	Camperdown	Apr-18	Oct-18	4	Ballarat North	Jun-20	Dec-20	4	Geelong	Nov-22	Dec-22	4
3	Castlemaine	May-18	Feb-19	4	Ballarat South	Oct-20	Dec-20	5	Hamilton	Oct-21	Dec-22	2
4	Eaglehawk	Nov-18	Mar-19	5	Bendigo	Aug-20	Dec-20	1	Koroit	Aug-21	Dec-22	2
5	Maryborough	Jun-18	Feb-19	5	Bendigo TS	Nov-20	Dec-20	5	Merbein	Nov-21	Dec-22	1
6	Winchelsea	Nov-18	Mar-19	5	Charlton	Sep-19	Dec-20	2	Stawell	Mar-22	Dec-22	1
7	Woodend	May-17	Feb-19	4	Colac	Jun-19	Dec-20	5	Waurm Ponds	Jun-22	Dec-22	4
8					Terang	Sep-20	Dec-20	2				
<b>Subtotal</b>				30				25				15
<b>Total</b>				30				55				70
<b>Target</b>				<b>30</b>				<b>55</b>				<b>70</b>

[1] The Planned Install dates are subject to change and represent targeted completion dates (noting that capital works will commence at least one year prior).

There are many variables that may be outside Powercor's control, including but not limited to the in-service performance of the new technology, product reliability and defect response, single supplier dependency, HV customer impacts, unforeseen (unintended) consequences of the REFCL performance (eg: SAIDI impacts), changing network augmentation requirements (eg: the timing of Torquay zone substation, and the relationship to Waurm Ponds). Powercor is committed to meeting the legislated dates.

The installation program includes, but is not limited to, all necessary substation works, line hardening and capacitive balancing works required to achieve the required performance criteria whilst ensuring a safe network and maintaining existing network reliability and supply quality, as a minimum. During the REFCL commissioning process, Powercor undertakes testing to ensure the network is adequately hardened and the REFCL performance is satisfactory.

#### REFCL Performance and Capability Assessment

As part of the process to validate REFCL performance, Powercor shall conduct Initial Capacity Testing (ICT) at each newly-commissioned zone substation prior to the legislated date to demonstrate that *each polyphase electric line originating from the substation has the required capacity* and that the nominated substation is a *complying substation*.

For those zone substations that have achieved the *required capacity*, Powercor will complete Annual Capacity Testing (ACT) prior to the fire season to demonstrate that *each polyphase electric line originating from the substation has the required capacity* and that the nominated substation is a *complying substation*.

Powercor will notify ESV prior to all compliance testing and provide the opportunity to observe the testing.

Testing will be conducted in accordance with the following documents:

- CP\_PAL\_REFCL\_101 – Policy for Initial Capacity Testing
- CP\_PAL\_REFCL\_103 – Demonstration of Required Capacity
- CP\_PAL\_REFCL\_104 – Selection and Record of Test Locations
- CP\_PAL\_REFCL\_105 – Facilities for REFCL Performance Testing
- CP\_PAL\_REFCL\_106 – Consideration of Influencing Factors

Results will be submitted noting the document version number used for the testing undertaken. Any amendments to these documents and the annual testing requirements are subject to ESV acceptance.

Completed assessments for each commissioned location will be submitted to ESV as part of the annual pre-summer reporting requirements.

Powercor will undertake bi-annual forecasts of network capacitance growth to identify risks in maintaining the required capacity. Significant projects required to mitigate performance risks from growth in network capacitance will be detailed in the Distribution Annual Planning Report (DAPR).

### Operating Modes

Three (3) operating modes are available for selection;

1. Fire Risk Mode – This mode utilises the **Soft Fault Confirmation** technique demonstrated at the 2015 REFCL Test program at Kilmore South.
  - a. When a fault is detected the REFCL applies residual compensation and minimises the voltage on the faulted phase.
  - b. After a configurable delay time, Powercor’s control relay requests a Soft Fault Confirmation test to confirm both the permanence of the fault and the identity of the faulted feeder.
  - c. If a permanent feeder target is identified, the feeder **Circuit Breaker is directly tripped**.

There is a tangible customer impact when operating in this mode as feeder based protective devices such as ACR’s and fuses will not operate, and so all customers on a feeder are disconnected regardless of fault location.

2. Normal Mode – This mode utilises the Classical Fault Confirmation technique more associated with typical resonant networks which only utilise the Arc Suppression Coil.
  - a. When a fault is detected the REFCL applies residual compensation and minimises the voltage on the faulted phase.
  - b. After a configurable delay time, Powercor’s control relay requests a Classical Fault Confirmation test to confirm both the permanence of the fault and the identity of the faulted feeder.
  - c. If a permanent feeder target is identified the feeder **Circuit Breaker is directly tripped**.

During the confirmation test, residual compensation is switched off leaving only a tuned coil in service and the current is limited to the residual only. There is still tangible customer impact since ACRs and HV fuses will not operate for earth faults.

3. Bypass Mode – This mode uses the **Soft Fault Confirmation** technique demonstrated at the 2015 REFCL test program at Kilmore South.
  - a. After a configurable delay time, Powercor’s control relay requests a Soft Fault Confirmation test to confirm both the permanence of the fault and the identity of the faulted feeder.
  - b. If a permanent feeder target is identified, the **Neutral Earthing Resistor (NER) Circuit Breaker** is closed.

Closing the NER permits the operation of conventional current based discriminant earth fault detection schemes which may expedite fault finding and fault restoration. Closing the NER / Direct Ground is only

permitted when the Ground Fault Neutraliser (GFN) calculates a resistance (from the delta admittance value) that suggests sensitive earth fault (SEF) clearance is possible. Otherwise a high impedance target is signalled to the station earth fault management (SEFM) relay and the REFCL bypass sequence is **blocked**.

When this occurs, the feeder CB is directly **tripped** and blocked from auto-reclosing.

- The high impedance fault target initiates for any calculated impedance greater than 706 ohms.
- 706 ohms represents an 18A earth fault, 150% of the standard minimum operating current for backup earth fault protection.

### REFCL Sensitivity

Earth fault sensitivity is an independent consideration to the selected operating mode. Powercor’s REFCL system is designed to be capable of three (3) separate setting groups for earth fault detection and these can be individually configured and selected for a given application.

Table 1 - REFCL Sensitivity Groups describes the intended earth fault sensitivity target for each setting group.

Setting Group	Sensitivity	Remarks
1	≤25.4 kΩ	Limit earth fault sensitivity (to 0.5 A or less) at the threshold specified by the “required capacity”
2	≈12.7 kΩ	Very high level of earth fault sensitivity (≈1.0 A)
3	≈6-8 kΩ	High level of earth fault sensitivity (≈1.6 - 2.1 A)

TABLE 1 - REFCL SENSITIVITY GROUPS

Note: Existing current based sensitive earth fault protection schemes detect earth faults up to 1.4kΩ (9 A).

### REFCL Application

Powercor will deploy REFCLs with the intention of targeting the maximum level of bushfire mitigation performance whilst maintaining the highest levels of system performance and reliability.

The choice of operating mode will be determined by the relative fire risk and the condition of the network.

Table 2 – REFCL application on Powercor 22kV Polyphase Networks describes Powercor’s intended use of REFCL technology for certain environmental conditions.

Condition	Operating Mode	Setting Group	Application
TFB Days	Fire Risk	1	To be configured to provide “required capacity” on TFB Days
Fire Season	Normal	2	The application of Normal Mode and Setting Group Two (2) provides superior earth fault protection whilst providing greater stability of the network. It is intended to provide a platform for the introduction and development of enhanced fault detection and isolation devices such as ACR’s and switches compatible with REFCL networks.
Nominal	Bypass	3	This application will be used outside the <i>fire season</i> <sup>1</sup> subject to reliability and system performance metrics.
Operational Switching	Various	3	All operational switching activities on the network which involve switching the 22kV network will be undertaken using Setting Group 3 and potentially further measures to de-sensitise the network

TABLE 2 - REFCL APPLICATION ON POWERCOR 22KV POLYPHASE NETWORKS

### REFCLs and High Voltage Customers

The Essential Services Commission (ESC) conducted a *Review of Voltage Standards for Bushfire Mitigation* in 2018. The outcome of the review changed the responsibility for REFCL-ready works from distribution businesses (DBs) to High Voltage Customers (HVCs). This has taken a key component of the REFCL program out of Powercor’s control. A REFCL cannot be safely operated:

- until all HVCs connected to that substation have completed their REFCL-ready works; or

- HVCs who are not REFCL ready have their supply interrupted or disconnected.

In consideration of our obligation to deliver safe and reliable electricity supply to all our customers, and to ensure there are no adverse impacts from not operating a REFCL, when a Total Fire Ban (TFB) day is declared and Powercor have completed their REFCL works for that substation Powercor intends to:

- Isolate any non-REFCL ready HVCs that are supplied from that substation; and
- Place the REFCL into service in the most sensitive operating mode available.

The decision to isolate a HVC will be made with due consideration of the impact to the customer and to the wider community.

Refer to Appendix A for more information.

### Performance Caveats on Required Capacity

Powercor intends to provide the highest level of bushfire protection possible, operating at “*required capacity*” on Total Fire Ban days. There are instances however where performance at “*required capacity*” cannot be guaranteed and/or achieved due to technical or system constraints, a non-exhaustive list of which is provided below:

- Network configuration outside the parameters of which “*required capacity*” was ascertained
- Any single phase switching of the following distribution assets will require the REFCL to be removed for service;
  - Greater than five (5) kilometres of overhead line or;
  - Any length of underground cable or;
  - Any section containing a capacitive balancing system
- Fire Risk Mode may be used in conjunction with Setting Group Two (3) or Three (3) should network conditions constrain the application of Setting Group One (1). Examples of such constraints are;
  - Network Configuration Abnormal due to contingencies
  - Unacceptable of loss of Capacitive Balance
- Performance at or near the required capacity will not be available should any of the REFCL Backup Protection systems be required to activate due to a contingent event
- The REFCL will be taken out of service should performance become unpredictable and impact the performance, reliability or safety of the network

### Backup Protection Functions – REFCL Networks

1. In modes where the Soft Fault Confirmation technique is preferred, the Classic Fault Confirmation technique will be requested in instances where the REFCL inverter is unavailable.
  - a. Unavailability may be due failure, internal disturbance or disconnection during the initial compensation process due to a second phase having been involved in the fault
2. REFCL systems installed on Powercor’s network will be supervised by an independent Neutral Overvoltage protection
  - a. The response of this protection will be to close the effective ground circuit breaker, bypass the REFCL and return to conventional earth fault protection
  - b. This shall occur if the REFCL has not correctly handled the fault, or responded to the fault in an acceptable time

This is applicable to all operating modes and is subject to change as our experience operating a REFCL network matures

### 6.6.2 Electric Line Construction Areas

As a preventative strategy to reduce the likelihood of powerline-initiated bushfires, the amended regulations define a higher standard for electric line works in the Electric Line Construction Areas (ELCAs). In accordance with these amended regulations, any Powercor new works to be undertaken in the Electric Line Construction Areas that meet the defined criteria will comply with the higher standards of construction. These standards will apply to construction of 22kV, SWER and LV assets and must utilise either:

- underground cable, or
- overhead covered conductor

Powercor's current technical solutions to address the construction standards required in Electric Line Construction Areas are as follows:

#### **6.6.2.1 Aerial Bundled Cable (ABC)**

ABC consists of three insulated cables wound around a bare catenary wire. The catenary wire 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.

The relevant Technical Standards are the ET-series (LVABC) and the EW-series (HVABC).

#### **6.6.2.2 Hybrid Underground**

Underground cable is used between pole type substation and HV tee pole above ground structures.

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

Hybrid underground on SWER systems in ELCA's will standardize on the use of Fault Tamers in lieu of EDO fuses and "code red" protection settings will be applied to SWER ACR's on TFB days.

The relevant Technical Standards are the GH-series (Hybrid Underground).

#### **6.6.2.3 Conventional Underground**

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.

The relevant Technical Standards are the GA-series (General), GB-series (HV cables and accessories), GC-series (Conduit and Cable Pulling), GE-series (Cable Head Poles) and GL-series (Kiosks and Substations).

These solutions are documented in Powercor's technical standards.

#### **Application of Electric Line Construction Area**

The higher standards in Electric Line Construction Areas form part of the Powercor design and construction processes from 1 May 2016 and are applied as follows:

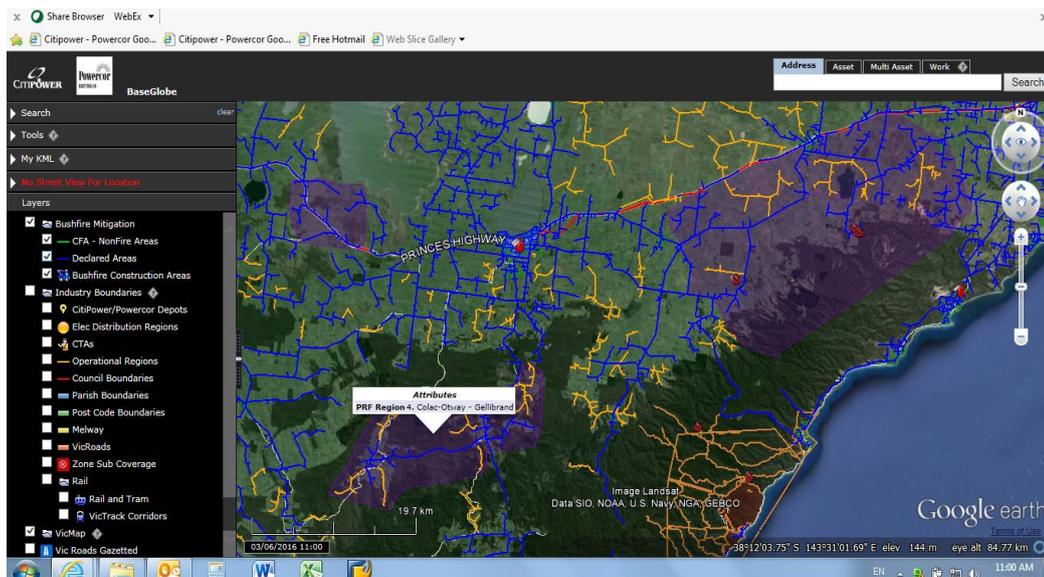
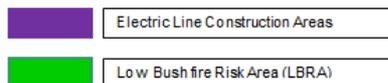
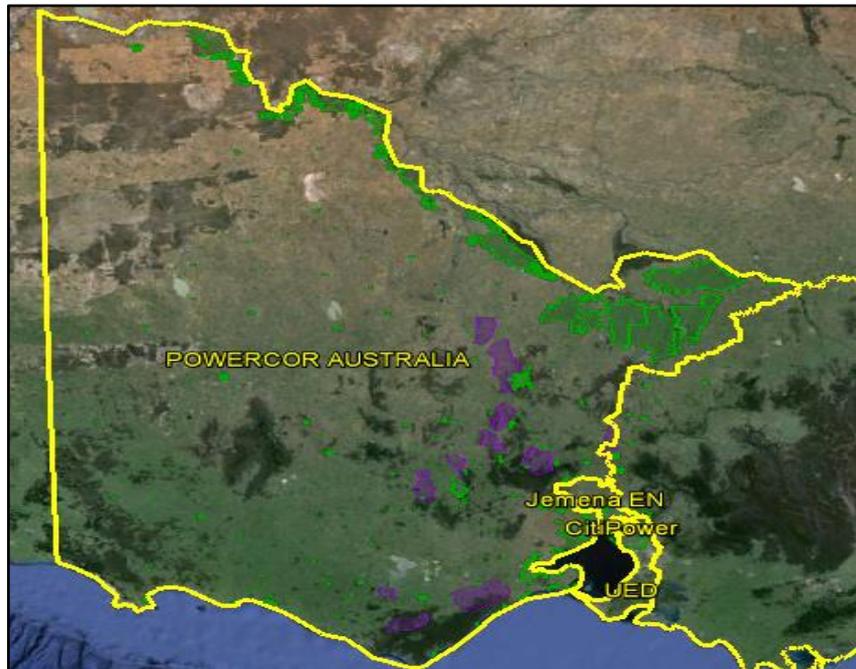
- all new construction ie: "greenfields":
  - new customer connections
  - new feeder or feeder extensions
- all works involving re-conductoring on 4 or more consecutive spans:
  - re-conductoring, conductor replacement or line relocation project greater than or equal to 4 consecutive spans
  - includes any subsidiary HV circuits and/or dual circuits on the same poles
  - includes any single span tee-off
  - excludes any multi-span spur lines that may tee-off from the spans being re-conductored
  - excludes maintenance works that affect the pole top structure on individual pole basis
    - eg: a crossarm change, a substation replacement
  - excludes replacement or upgrades of assets on individual poles
    - eg: a pole substation upgrade, a switch replacement
- excludes any fault repair works that inhibits timely restoration of supply to customers
- excludes 66kV works

All customer initiated projects comply with the above criteria from 1 May 2016

### Identification of Electric Line Construction Areas

There are 15 Electric Line Construction Areas in Powercor’s distribution area. The areas are in accordance with the amended regulations and are derived from plans lodged in the Central Plan Office of the Department of Environment, Land, Water and Planning. These areas can be viewed on Powercor’s Map Insights application by selecting “Bushfire Construction Areas” layer. The areas are displayed in purple, and all assets within these areas are visible to the user.

A screen capture from Powercor’s Google Earth Enterprise application showing these areas (shaded purple) is shown below, including a close up of the Colac area.



### 6.6.3 SWER ACRs

Powercor will install SWER ACRs as per the program summarised in section 6.6. The program will achieve completion of all SWER ACRs within the 2016 – 2020 regulatory periods.

Given the high volumes involved, Powercor will use alternate approved products dependent on supplier availability and contractual arrangements over the duration of the program. Subject to Powercor technical approval processes, this may include but not be limited to the Schneider W27, the Siemens Fuse saver O-CO and/or the Noja OSM models.

Auditing of the effectiveness of the inspections carried out under the plan is discussed in section 10.1.

### 6.6.4 Reporting

Powercor will provide progress and status reports to ESV in accordance with ESV requirements. Powercor and ESV have agreed on a reporting format that addresses

1. REFCL deployment with key program milestones
2. SWER ACR deployment with monthly totals completed (planned vrs actuals)
3. Electric Line Construction Areas with monthly deployment totals

This report is to be submitted monthly.

In addition, an annual compliance report will be provided on or before the 1<sup>st</sup> August of each year to meet the requirements of the Electricity Safety Amendment (Bushfire Mitigation Civil Penalties Scheme) Act 2017.

## 6.7 ESV DIRECTIONS

Under section 141 (2)(d) of the Electricity Safety Act 1998, ESV may issue directions in relation to electrical safety.

### Current Directions

Bushfire Mitigation related Directions issued by ESV to Powercor that are currently open include;

- SWER ACR Replacement/Installation Program
- Fitting of Armour Rods and Vibration Dampers : issued 4 January 2011
- Fitting of Spacers in Aerial Lines : issued 4 January 2011

### SWER ACR Replacement/Installation Program

In relation to the ESV direction relating to the installation of New Generation Electronic Automatic Circuit Reclosers (ACRs) to single wire earth return (SWER) lines issued on 5/4/2012, Powercor includes the following information:

1. **(Direction)** - *The location of all SWER ACRs whose protection settings and reclose functions cannot be remotely controlled by Powercor's SCADA system.*

A list showing the location of these SWER ACRs is shown in **Appendix H**.

(Please note - that this list includes all such ACRs that are on SWER systems including systems that have multiple ACRs).

2. **(Direction)** - *The location of all SWER fuses downstream from the SWER isolating transformer, excluding distribution substation fuses.*

A list showing the location of these SWER fuses is shown in **Appendix I**.

(Please note - that Powercor's understanding of the intent of this direction, as agreed in discussions with ESV and confirmed in our letter dated 24 April 2012, is to identify all SWER systems that do not

have an ACR of any description. The intent was not to provide detail of all downstream fuses where such fuses exist in addition to the first fuse on the SWER system).

3. **(Direction)** - A description of the methodology to be used to prioritise the installation of ACRs identified in (1) and (2) above.

The following methodology has been used to prioritise the installation of remotely controllable devices at those locations identified in (1) and (2) above.

- i. The first group of 179 SWER ACR's were completed as listed in the Powercor 2013 Quarter 2 MEC Report). Since 2012 new generation ACR's have been progressively installed as part of replacement or augmentation projects. This has reduced slightly the number of new generation ACR's required to be installed as part of the targeted replacement program (2016-2020).
- ii. The remaining SWER ACR's will be replaced during the 2016-2020 period. These remaining manual ACR's will be prioritised based on
  - a. 80% Highest Consequence using the Tolhurst model 2015/16 Ash Wednesday FDI140 with no previous burn history consequence scenario, and
  - b. SWER ACR that are within the Electric Line Construction Areas
- iii. The last priority will be to install ACRs on current fuse protected SWER systems. These will also be prioritised based on (i) and (ii) above.
- iv. In addition, whenever there is a need through fault maintenance or system augmentation to replace or install a SWER ACR outside of the highest consequence area, the new generation device will be used.

Where there are program efficiencies realised in installing an ACR in a location with a lower prioritisation rating, this will be brought forward ie: ACR's in a similar geographic location

4. **(Direction)** - A program is developed by 31 August 2012 to ensure that all locations identified in (1) and (2) above have ACRs, whose protection settings and reclose functions can be remotely controlled by Powercor's SCADA system.

A program for the replacement of all SWER ACRs identified in (1) and (2) above is shown below:

Period	2016	2017	2018	2019	2020
Volume	117 <sup>[1]</sup>	145 <sup>[1]</sup>	383 <sup>[1]</sup>	265	150

[1] actuals installed

5. **(Direction)** - That sufficient ACRs are installed by 30 November 2012 to eliminate the need to attend and manually suppress the automatic reclose function on any SWER lines in the areas of highest 80 percent fire loss consequence on total fire ban and code red days.

Refer to 3(i) above. *This direction is completed.*

6. **(Direction)** - A reporting mechanism is in place to track the progression of (4) and (5) above.

Refer above, section 6.5.4 – Reporting

7. **(Direction)** - Progression of the plan, including targets, is reported to Energy Safe Victoria (ESV) on a quarterly basis.

Refer above, section 6.5.4 – Reporting

### Fitting of Armour Rods and Vibration Dampers

This direction was issued on 4 January 2011, with the requirement to establish and deliver a program that would ensure that all locations requiring the fitting of armour rods and/or vibration dampers to be completed;

- In HBRA – before 1 November 2015 - *this direction was completed in 2015*
- All other areas (LBRA) – before 1 November 2020 - *this direction was completed in 2018*

### Fitting of Spacers in Aerial Lines

This direction was issued on 4 January 2011, with the requirement to establish and deliver a program that would ensure that;

- Bare wire LV spans in HBRA areas are to have LV spreaders fitted – *this direction was completed in 2011*
- Conductors on the same support to maintain minimum separation in accordance with ENA document C(b)1 Guidelines for design and maintenance of overhead distribution and transmission lines.
  - In HBRA – before 1 November 2015 - *this direction was completed in 2016*
  - All other areas (LBRA) – before 1 November 2020

The following program is in place to ensure the completion of this direction in the remaining LBRA

	2018	2019	2020	TOTAL
<b>LBRA</b>	Survey <sup>[1]</sup> ~ 6,800 spans surveyed	Design validation <sup>[2]</sup>	Construction TBA <sup>[2]</sup>	TBA <sup>[2]</sup>

<sup>[1]</sup> A LiDAR survey was undertaken in 2018 and preliminary clearance violations identified.

<sup>[2]</sup> The final quantity of clearance violations will be known at the completion of the design validation stage.

## 6.8 ESV EXEMPTIONS

Under regulation 13 of the Electricity Safety (Bushfire Mitigation) Regulations (*the Regulations*) 2013, ESV may issue exemptions from compliance to *the Regulations*;

### Current exemptions

Issued by ESV on 7 November 2018 in respect to nominated segments of polyphase electric lines which are exempt from the requirement to have required capacity;

- Regulation 9(1)(ha) of *the Regulations*
- Regulation 7(1)(hb) of *the Regulations*
  - Castlemaine (CMN) zone substation – 3 line segments
  - Colac (CLC) zone substation – 4 line segments
  - Eaglehawk (EHK) zone substation – 6 line segments
  - Winchelsea (WIN) zone substation – 2 line segments

Each exempt line segment will addressed by either:

- Being covered or placed underground, or
- Configured to achieve required capacity, or
- Removed from service due to conversion of supply from HV to LV.

Each exempt line segment was addressed prior to 1<sup>st</sup> November 2019.

## 6.9 VEGETATION MANAGEMENT

Powercor is responsible for the management of vegetation around power lines and other electricity assets in both the rural and urban areas of the network. In some urban locations there are “Declared Areas”, where the Councils are managers of public land and are responsible for keeping trees clear of electric lines.

Powercor’s vegetation activities are managed in accordance with:

- **Electric Line Clearance (Vegetation) Management Plan**

Powercor’s Electric Line Clearance (Vegetation) Management Plan has been submitted to ESV for endorsement as prescribed by the Electricity Safety (Electric Line Clearance) Regulations 2015. The plan

outlines management processes, programs and cycles for maintaining clearances between vegetation and network assets.

## 6.10 PRIVATE OVERHEAD ELECTRIC LINES

### Inspections

Powercor has an obligation under the Electricity Safety Act 1998 to inspect Private Overhead Electric Lines (POELs) that are above the surface of land within its distribution area, other than any prescribed parts of those lines as defined in Regulation 8 of the Electricity Safety (Bushfire Mitigation) Regulations 2013. Point of Supply definitions are determined as per the Electricity Safety Act 1998. POELs are inspected to identify any defects, or infringing vegetation, which may affect the fire and/or electrical safety of the line.

Inspections are undertaken to include the prescribed standards of inspection contained in section 10 of the Electricity Safety (Bushfire Mitigation) Regulations 2013. There are 3 variations to these prescribed standards of inspection being applied by Powercor.

Powercor meets the required outcomes of regulation 10(1)g(ii), 10(1)g(iii) and 10(1)h(ii) by the inspection techniques shown in (1) and (2) below.

- (1) The condition of hardwood POEL poles located in concrete is determined by drilling down at an angle to inspect the condition of the pole below concrete level to determine the millimetres of wood free of decay and the presence of termites.
- (2) The condition of treated pine POEL poles is determined by assessing the degree of external rot and also measurement of the pole girth. Powercor meets the required outcomes of regulation 10(1)i by the inspection technique shown in (3) below.
- (3) The condition of steel POEL poles located in concrete is determined by a visual inspection down to the point where the pole enters into the concrete to ensure that the pole retains 75% of steel thickness in the corroded area when compared against a non-corroded area on the pole.

The POEL inspection program is conducted in accordance with:

- **Policy No. 05 - C001.D - 430 - Low Voltage Private Overhead Electric Lines**
- **Policy No. 05 - C001.D - 431 - High Voltage Private Overhead Electric Lines**
- **Manual 05 - M450 - Powercor Asset Inspection Manual**

Powercor's inspection cycle for Private Overhead Electric Lines is as follows:

***All Private Overhead Electric Lines (POELs) required to be inspected, shall be inspected within a 36 month timeframe.***

Powercor's asset inspectors attempt to liaise with POEL owners regarding POEL inspection requirements before commencing any work. If the POEL owner is not home or is not spoken to, the asset inspector is required to leave a pamphlet informing POEL owners that an inspection of their POEL was undertaken, a brief summary of inspection findings and general information regarding POELs including the requirement for Powercor to inspect POELs as required under the Electricity Safety Act 1998. A copy of this pamphlet is contained in **Appendix D**.

The annual POEL mail out ensures that all Powercor customers who have a POEL will receive a letter and a brochure. The letter provides relevant information as well as our policy on defective POEL's. The brochure covers topics including ownership, responsibilities, maintenance, vegetation clearance, electrical safety, disconnection and a guide to POEL inspection. The mail out of these normally commences in early November.

Powercor notifies the owners of up-coming POEL inspections, as required in the Electricity Safety (Bushfire Mitigation) Regulations 2013. These letters notify the owner which part of the line we will be inspecting and what will happen if defects are found (Refer **Appendix E**). Notice is given not less than 21 days and not more than 45 days before inspection.

### **Disconnection**

Private Overhead Electric Lines that are identified as having a fire risk defect are disconnected on TFB days. Land owners, or occupiers, who are responsible for a defective POEL, are given up to 30 days to rectify vegetation infringements or other urgent defects. Every attempt is made to contact the customer by phone as soon as we become aware of the defect during the declared fire danger period. If such defects are not corrected within this time the owner, or occupier, is given further written notice following which they are advised that the matter has been referred to the ESV as required, according to referral advice provided by ESV.

Powercor regularly contacts the responsible land owner, or occupier, by telephone to monitor the progress of corrective action. POEL's referred to ESV for non-compliance are reinspected in accordance with POEL policy.

Any hazardous POEL's found during inspections are disconnected to ensure fire and/or electrical safety. Supply is not restored until the installation is safe to reconnect.

ESV has approved the disconnection of POEL's with urgent fire defects on TFB days. When a disconnection is necessary, Powercor's Customer Compliance Group advises the customer and creates an entry in OMS which prompts the Operations Control Centre to dispatch a crew to disconnect supply.

Identification and rectification of defective Low Voltage POELs are managed in accordance with the following:

- **Procedure JEQA4UJ443MT-158-503 - Identification and Rectification of Defective POELs (LV)**

The specific actions required for the management of POELs with outstanding urgent fire defects, on days of TFB, are contained in Powercor's TFB Day Action Plan (refer **Appendix A**).

## **6.11 NEW TECHNOLOGIES AND INITIATIVES**

Powercor is committed to continuous improvement and this often involves trialing or developing new technology/initiatives, which if proven successful, are adopted as normal business practice.

Examples of these include:

- Development of a Bushfire Risk Model to provide a greater understanding of the relative bushfire risk at any point on the Powercor network. The model will facilitate improved asset management and operational decision making informed by a quantitative fire risk analysis. The model is using the SPARK fire risk model developed by the CSIRO.
- Development of a bushfire mitigation communication and engagement plan to improve both internal and external stakeholder awareness, engagement and preparedness towards catastrophic bushfires
- Introduction of a new Vegetation Management System (VMS)
- Assessment and trial of HV covered conductor and, if approved, introduce an alternate solution to rural UG in the designated Electric Line Construction Areas and other identified high risk fire areas.
- Installation of REFCLs at 22 zone substations in accordance with the BM regulations
- Evaluation and trialing of IND.T 's Early Fault Detection technology on in-service SWER systems
- Evaluation of additional non-destructive testing technologies for wood pole condition assessment
- Development of smart meter signature detection algorithms to identify deteriorating LV switching devices eg: FOLCBs and FSDs
- Development and trial deployment of a broken conductor detection and isolation technology

Each of these initiatives/projects are in various stages of investigation or implementation.

The undertaking of these initiatives reaffirms Powercor’s commitment to developing and maintaining its electricity supply network to reduce the bushfire risk across its distribution area.

## 6.12 BUSHFIRE ASSET REPLACEMENT AND TECHNOLOGY IMPLEMENTATION PROGRAMS

Powercor has identified numerous asset replacement and emerging technology opportunities to introduce improved risk reduction solutions into the highest fire risk areas of the network. Examples include:

- Proactive wooden pole replacements
- SWER replacement program targeting ELCAs
- REFCL area reliability maintenance program
- Replacement of EDO fuses with less fire-prone protection solutions
- Deployment of Early Fault Detection technology
- Deployment of HV covered conductor technologies
- Trial deployment of a broken conductor detection and isolation technology
- Replacement of deteriorating FOLCBs and FSDs
- Replacement of HV wooden crossarms

### 6.12.1 Proactive wooden pole replacement program

Powercor is submitting a proposal as part of its 2021 to 2025 Electricity Distribution Price Reset to sustainably manage its wooden pole population resulting in an increase in wooden pole interventions. This will also address the heightened safety concerns from the community in relation to the ageing pole population.

The business as usual condition based wood pole replacement volume over the period will be supplemented with a risk based asset management program of approximately 23,000 additional pole interventions.

Energy Safe Victoria (ESV) have assessed and provided recommendations to support Powercor’s wood pole management strategies.

### 6.12.2 SWER Replacement Program

Powercor will be retiring ~98km of bare wire SWER overhead in ELCAs with underground cable or covered conductor in 2019-20.

Powercor is submitting a proposal to the Australian Energy Regulator to continue to replace bare wire SWER overhead in ELCAs with underground cable or covered conductor solutions. The following high level program beyond 2020 is proposed :

Period	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Km’s retired</b>	28	70	47	40	45	53	48	50	48	38	38	18
<b>Projects</b>	Various locations	Various locations	ELCA region 4	ELCA region 6,9	ELCA region 11,17	ELCA region 10,16	ELCA region 18,21	ELCA region 18	ELCA region 18	ELCA region 29	ELCA region 29	ELCA region 17,30,32

NOTE: the proposed works in 2021-2025 and 2026-2030 will be submitted as a Contingent Project Application to the AER in 2020. All km’s are approximate until final designs are completed.

### 6.12.3 REFCL Area Reliability Maintenance Program

Our existing ACRs provide network protection at the feeder level. Existing ACRs are not technically compatible with REFCLs which provide protection at the zone substation level. As a result network outages downstream of the ACR are isolated by the REFCL at the zone substation level. This has a negative impact on local network supply reliability and consequently, community safety.

Powercor is submitting a proposal as part of its 2021 to 2025 Electricity Distribution Price Reset to replace existing 22kV ACRs with ‘Smart ACRs’ which are compatible with REFCLs enabling us to mitigate the negative reliability impact of REFCLs.

This will improve community safety by reducing the number of customers affected by REFCL-initiated sustained outages, particularly on extreme heat and fire risk days.

#### **6.12.4 Replacement of EDO Fuses**

To reduce the risk of expulsion dropout (EDO) fuses starting a bushfire to as low as reasonably practicable, in accordance with the Electricity Safety Act 1998, Powercor is submitting the following proposal as part of its 2021 to 2025 Electricity Distribution Price Reset.

Powercor's proposal is to proactively replace all EDO fuses with fault tamers in Electric Line Construction Areas (ELCAs), and progressively replace EDO fuses with fault tamers in Hazardous Bushfire Risk Areas (HBRAs) other than ELCAs, as part of the regular inspection and maintenance program.

#### **6.12.5 Deployment of Early Fault Detection Technology**

Powercor will continue to trial and deploy the Early Fault Detection technology on HV lines in identified high risk fire areas.

#### **6.12.6 Trials of Emerging Technologies**

Powercor will continue to trial HV covered conductor technologies with a view to selecting a preferred solution for ongoing deployment on the network.

Powercor is also involved in the development and trial deployment of a broken conductor detection and isolation technology which if successful, will rapidly isolate a broken HV conductor before it hits the ground.

#### **6.12.7 Replacement of Deteriorated Fused Overhead Line Connector Boxes (FOLCBs)**

Powercor is continuing to develop AMI smart meter analytics to proactively detect deteriorating FOLCBs. If successful, Powercor will implement a proactive replacement program for identified FOLCB defects in the highest fire risk areas.

This program is being submitted as part of Powercor's 2021 to 2025 Electricity Distribution Price Reset.

#### **6.12.8 Replacement of Deteriorated Fuse Switch Disconnectors (FSDs)**

Powercor is continuing to develop AMI smart meter analytics to proactively detect deteriorating FSDs. If successful, Powercor will implement a proactive replacement program for identified FSD defects in the highest fire risk areas.

This program is being submitted as part of Powercor's 2021 to 2025 Electricity Distribution Price Reset.

#### **6.12.9 Crossarm Replacement Program**

Traditionally proactive crossarm replacement programs have targeted high supply reliability consequence areas. Whilst Powercor will continue to do this work, this specific program will focus on wooden crossarm replacements in the highest fire risk areas.

### **6.13 RESOURCING**

Powercor ensures appropriate resources are available to carry out the activities outlined in this plan.

Each year, typically in the third quarter, historical data is entered into various forecasting models for asset maintenance activity. The forecasts obtained from these models, for following years work, are then entered into Powercor's Asset Management System (SAP). Resource requirements are then checked against the projects listed in SAP and resources are sourced accordingly.

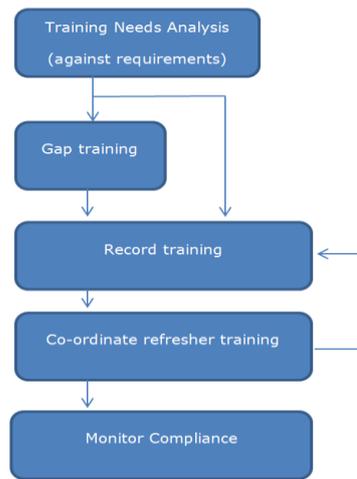
A detailed asset inspection program, of the following years work, is developed and provided to our asset inspection contractor to enable them to plan their resource requirements to meet the program's needs.

Powercor is responsible for the overall vegetation program management with sub-contractor/s engaged to complete inspection and cutting tasks.

### **6.14 TRAINING**

Powercor has an established and documented system to ensure that employee and contractors who are working on or near the Networks are suitably competent and adequately trained to carry out their duties.

The key steps that Powercor has in place to manage competency and training requirements are illustrated below:



**Fig. Competency and training process**

In Powercor, the Electricity Networks business unit sets the training standard for workers who are working on or near the Network. The training standards are established through the industry committee VESI Skills and Training Reference Committee for consistency within the State and nationally through the Industry Skills Council (name to be changed to Service Skills Organisations in 2016 refer <https://www.education.gov.au/AISC> for more information).

If training is required specifically for Powercor this is co-ordinated as Enterprise training for employees. For contractors, requirements for additional training would be included in a contract agreement.

Powercor has a documented **Technical Training Policy (JEQA4UJ443MT-173-25)** and **Technical Training Guideline (JEQA4UJ443MT-173-28 )** which references the training requirements.

All Asset Inspectors are required to meet the training requirements as specified in the VESI Skills and Training Matrix for Asset Inspectors. These training requirements are confirmed by Powercor when an application request is made for an Asset Inspector to work on the network.

Where the qualification (being Cert II in ESI Asset Inspection UET20612 or subsequent version) has been attained in a State or Territory of Australia other than Victoria, induction to Powercor requirements (including our procedures) is conducted by a person holding a Certificate IV in Training and Assessment.

Powercor has developed enterprise specific competency standards for the activity of asset inspection. These standards provide contractors and training providers with the information necessary to develop appropriate training courses that will enable individuals to become approved to inspect Powercor assets.

### **Ongoing competency**

Audit processes are in place to ensure that there is consistent application of knowledge and skill to the standard of performance required for asset inspectors.

Asset Inspector audit findings are rated and the cause of the finding identified. This may result in the need for refresher training or mentoring of the Asset Inspector to ensure the required competency is achieved.

Overall performance of the asset inspector is monitored whereby frequency rates of audits are determined based on their performance.

Powercor has implemented the Australian ESI Skills Passport in 2010. The Australian ESI Skills Passport system has enhanced the portability of the ESI workforce by mutual recognition of agreed training standards. Training is recorded in the passport and can be viewed to confirm currency of training for the task being undertaken. Further information can be located at [www.esipassport.com.au](http://www.esipassport.com.au).

The training programs for specific job roles in bushfire mitigation activities are described below:

### Asset Inspection

As per ESV's Training Approval Statement, Asset Inspectors working on the Powercor network are required to hold a Certificate II in Asset Inspection (**Course Code: UET20612** or subsequent version).

The VESI Skills and Training Matrix stipulate the requirements and frequency of refresher training for Asset Inspectors. The matrix is available at [www.vesi.com.au](http://www.vesi.com.au)

### Vegetation Management

All training requirements for vegetation management are covered in the Electric Line Clearance (Vegetation) Management Plan.

### Line Work

The VESI Skills and Training Matrix stipulate the qualifications and refresher training for a Line worker. The employing company is required to organise training to the standards referred to in the matrix. The employing company will keep records of all training undertaken.

Line worker apprentices are engaged in bushfire mitigation activities from time to time. This provides experience in a broad range of tasks. When companies engage apprentices they work under the VESI Apprentice Supervision Guidelines as published on the VESI website. [www.vesi.com.au](http://www.vesi.com.au)

Formal training of apprentices, in line work, is conducted by a RTO and this training is supported "on the job" by designated mentors and tradespersons.

### Technical Standards

Powercor's Technical Standards group provide information to Powercor employees, Local Service Agents (LSAs) and contractors with regard to new initiatives in the design and construction of network assets, generally on a monthly basis. If a significant new item of equipment or a significant new technical standard is being introduced, then specially convened information sessions may be conducted.

All contractors or other external persons associated with works on Powercor assets can register with Powercor to gain "read only" access to Powercor's technical standards.

Information sessions are also stored in the "Source" document portal on Powercor's Intranet System for future viewing.

## 6.15 LIAISON WITH OTHER ORGANISATIONS

Powercor has a procedure for coordinating BFM activities and emergency procedures with relevant organisations which may include any of the following:

- Energy Safe Victoria (ESV)
- Country Fire Authority (CFA)
- Metropolitan Fire Brigade (MFB)
- State Emergency Service (SES)
- Department of Environment Land Water & Planning (DELWP)
- Department of State Development, Business & Innovation (DSDBI)
- Municipalities
- Mutual Aid Plan Planning Committee (MAPPC)
- Bureau of Meteorology
- Other Distribution/Transmission Network Operators

Actions to be undertaken in the event of a major event or emergency are contained in:

- **JEQA4UJ443MT-185-28490– Incident Management Procedure**

- **Manual 13 - 40 - CP0001 Crisis and Emergency System Management Manual**
- **Manual 13 - 40 - M0002 - Event Command Organisation Manual**

These documents include the responsibilities for communications with emergency services and other relevant organisations during events such as:

- Loss of the Operations Control Centre
- Major supply outages
- Major plant faults
- Lack of supply capacity (load shedding)
- Fires and Incidents

Communication processes for BFM related activities are managed in accordance with:

- **Procedure 16 – 30 – P0003 - Coordinating Bushfire Mitigation with other Organisations**

### 6.16 PUBLIC AWARENESS

In an effort to maintain community awareness of bushfire hazards, Powercor provides information to the public concerning various BFM activities. Powercor has a commitment to enhancing public awareness of:

- the potential risks associated with POELs
- the risks of planting inappropriate vegetation near electrical lines
- vegetation species suitable for planting near powerlines
- inspection timeframes
- other fire related matters

As part of its Vegetation Management and POEL inspection programs Powercor makes the following information brochures available to its customers, free of charge:

- “Planting Trees Near Power Lines”
- “POELs - Understanding Your Responsibilities”

Powercor prepares an annual BFM communications plan with a high level objective of being recognised as an organisation which values genuine engagement with its key stakeholders and local communities.

The communications plan may be outworked using various forms and channels including social media posts, traditional media releases, newspaper articles & advertisements, radio advertisements & interviews, TV interviews and face to face meetings with various stakeholders.

Powercor sends out an annual communication to Registered Electrical Contractors (RECs) within our service territory, in an effort to raise awareness and appreciation of the importance of POEL maintenance works and complying with the regulations and Powercor’s processes.

For details of communication with POEL owners refer Section 6.10.

### 6.17 ASSISTANCE PROVIDED TO FIRE AGENCIES

There are two rural fire fighting services, operating within Powercor’s service area:

- The DELWP are responsible for state forests and parks.
- The CFA is responsible for all other rural areas and is resourced largely by volunteers.

Powercor will provide assistance and work with the relevant fire control agency in the investigation of fires near our supply network.

Powercor's Emergency Management Liaison Officers (EMLOs) are available to attend fire agency command centres and provide information or assistance with issues relating to our distribution assets. An EMLO is a person that acts as a go-between or the link between two organisations to communicate and coordinate their activities.

### **Emergencies**

Any requests for resources to assist fire agencies are coordinated by the Network Controller, from Powercor's Operations Control Centre.

Fire emergencies are communicated directly to the Operations Control Centre via a direct phone number for emergency services organisations. Fault Crews are then promptly dispatched according to the information received.

Powercor will work with the relevant fire control agency to provide safe access to a fire or accident scene involving Powercor assets. This may include de-energisation of electrical assets upon request.

Actions to be undertaken in the event of a major event or emergency are contained in:

- **JEQA4UJ443MT-185-28490– Incident Management Procedure**
- **Manual 13 - 40 - CP0001 - Crisis and Emergency System Management Manual**
- **Manual 13 - 40 - M0002 - Event Command Organisation Manual**

Powercor also has representation on the State Control Centre Electricity Industry roster for Emergency Management Liaison Officers (EMLOs). An EMLO will provide the technical or subject matter expertise relating to the Electricity Industry and embeds an EMLO into the SCC to provide face-to-face coordination.

### **Information Exchange**

There are a number of different forums for information exchange to take place between the fire agencies and Powercor.

A Regional Integrated Fire Management Planning Committee operates in each Region. Each committee includes representatives from the CFA, local Brigades, DELWP, and local municipalities. A Powercor representative may either attend committee meetings or provide written reports on the status of Powercor's Bushfire Mitigation Program.

Each year prior to the fire danger period, the CFA is requested by ESV to hold an information day to provide a briefing and forecast for the coming season. Information presented includes the likely severity of the season and identification of high risk areas. This information day is attended by Victorian electricity distributors (including Powercor), transmission operators and representatives from the ESV.

Information relating to the Fire Season declaration dates is provided to Powercor by CFA both through the receipt of Fire Season Declaration notices and also through discussions with CFA Regional Community Safety Managers.

## **6.18 TOTAL FIRE BAN DAYS**

Powercor has a TFB Day Action Plan which is invoked on TFB days. The TFB Day Action Plan contains BFM strategies, to be employed on days of extreme fire weather conditions, to minimise the risk of a fire ignition being caused by the Powercor's electricity network.

The TFB Day Action Plan is implemented under the direction of the Manager Control with assistance from the TFB Day Coordinator. A copy of the TFB Day Action Plan is attached in **Appendix A**.

POEL's which are located in hazardous bushfire risk areas and have defects which are not fire safe are disconnected on days of TFB. These lines are not reconnected until the end of the TFB or until the fire danger has subsided.

For works involving welding, cutting, grinding, or use of naked flame, permits from the appropriate organisation (eg. CFA, MFB, and DELWP) are used and adhered to.

### **Enhanced Protection and Suppression Settings on Total Fire Ban days**

Enhanced TFB day protection settings are applied to nominated circuit breakers, SWER ACRs and 3 phase ACRs to reduce the fault energy in the event of a fault.

For the nominated ACRs that do not have the enhanced TFB Day setting functionality, these devices will have auto-reclose suppressed on TFB days

The enhanced TFB day protection setting regimes are applied based on the following criteria:

- Devices located within 80% Highest Consequence using the Tolhurst model 2015/16 Ash Wednesday FDI140 with no previous burn history consequence scenario
- Devices that are within the Electric Line Construction Areas
- Devices within 80% Highest Consequence using the Tolhurst model 2015/16 Ash Wednesday FDI70 with previous burn history consequence scenario and where the fault energy > 1 mJoule

NOTE: All new generation SWER ACRs, regardless of the location, will have enhanced TFB Day settings applied on TFB Days.

### 6.19 DECLARED FIRE DANGER PERIOD

During the Declared Fire Danger Period, Powercor will continue with normal operation of its electrical assets. The majority of Powercor's Operational and Maintenance activities are configured to be undertaken for the full 12 months of the year, irrespective of Declared Fire Danger Periods.

There are however some activities that are specific to the Declared Fire Danger period. These include:

1. Vehicle Movement Off-road (see **Appendix C**)
2. Use of Flame /spark omitting equipment (see **Appendix C**)
3. Fire Fighting Equipment to be carried ( see **Appendix C**)
4. Line Condition Observation Program – This is a series of field observations undertaken across the distribution network (see **Section 10.1 Auditing**)
5. Enhanced BFM Activities – This is a program of additional activities that may be undertaken each fire season. A decision is made by Senior Management based on information received from various sources, including the CFA and other emergency services. Activities that are considered include:
  - Additional Thermographic and Corona Camera inspections emanating from selected zone substations in high risk areas identified by CFA.
  - Focusing some of the existing audit/observation programs in these high risk areas identified by CFA.
  - Additional auditing/observation programs covering both asset condition monitoring and vegetation management in high risk areas identified by CFA.

### 6.20 FIRE MANAGEMENT

In the event of a fire, Powercor's Operational and Maintenance activities include:

- Receiving notification from or supplying notification to the relevant fire control agency regarding a fire event.
- Liaison with the relevant fire control agency regarding appropriate actions as required.
- Dispatching field crews for fault rectification or as directed/requested by the relevant fire control agency.
- Deployment of Emergency Management Liaison Officers if required to any Incident Control Centre established by the relevant fire control authority.
- Managing the fire event in accordance with:
  - **Event Command Organisation Manual 13-40-M0002**
  - **JEQA4UJ443MT-185-28490– Incident Management Procedure**

### 6.21 HIGH VOLTAGE AERIAL BUNDLED CABLE REPLACEMENT

To further mitigate the risk of bushfire, Powercor undertook a replacement program to replace the Non-Metallic Screened High Voltage Aerial Bundled Cable (NMS-HVABC) within the hazardous bushfire risk areas.

Powercor replaced all of the NMS-HVABC (25 separate projects, total of 6.1kms) within HBRA. Design and planning commences in early 2017, with construction commencing in late 2017. All sites were completed in 2018.

The sites are listed in **Appendix G**.

## 7 Program Timing

Powercor have produced a set of combined BFM program milestones which specify the completion dates required for key BFM activities. A copy of the BFM program milestones document is attached in **Appendix B**.

The asset inspection program dates are determined by the maintenance plan, in accordance with the relevant asset policy and are generated from SAP (Refer **Section 6.2**).

Remedial maintenance and asset replacement/modification is completed accordance with the priority classification policy (refer **Section 6.3**).

Timing of Vegetation management activities are undertaken in accordance with Powercor's Electric Line Clearance (Vegetation) Management Plan.

## 8 Fire Investigation

Any fire starts initiated by Powercor Assets according to ESV reporting guidelines are reported to ESV. The Network Control Room identifies any fire starts from outage information or from external advice and notifies the Network Availability Officer (NAO) who investigates each situation according to the information provided. The NAO then sends completed reports to the Manager Risk Management for checking and collation and forwarding to ESV as per the ESV reporting guidelines.

At the annual BFM post season review, ground fire start statistics are presented and discussed.

The following manual and policy cover the reporting requirements for fire starts:

- **JEQA4UJ443MT-185-28490– Incident Management Procedure**
- **Policy 18 - 80 - CP0007 – ESMS Reporting to Energy Safe Victoria (ESV) and Fire Start Reporting to AER**

The Incident Reporting & Investigation Manual describes the requirements for the reporting and investigation of incidents involving employees and contractors, plant, property, customers or customer installations and facilities belonging to others where CP/PAL assets or works are involved.

The manual ensures that CP/PAL meets its responsibilities to employees, customers, members of the public and regulatory requirements.

Fires initiated from CP/PAL assets are reported in accordance with the manual and to the requirements stipulated in ESVs "Electrical Infrastructure Safety – Electrical Incident and Safety Performance Reporting Guidelines" located on the ESV website:

[http://www.esv.vic.gov.au/Portals/0/electricity%20professionals/files/esms/Electrical\\_Safety\\_Performance\\_Reporting\\_Guidelines\\_Jun2016.pdf](http://www.esv.vic.gov.au/Portals/0/electricity%20professionals/files/esms/Electrical_Safety_Performance_Reporting_Guidelines_Jun2016.pdf)

## 9 Key Measures

### 9.1 BFM INDEX

The BFM Index is an index of preparedness measured against 4 key elements of our BFM program. It measures the performance of a range of inspection and maintenance activities against policy targets as well as vegetation outside policy clearance. The index is constructed from figures contained in Powercor's consolidated BFM status report.

The BFM status report includes a breakdown of the individual elements that comprise the index, with their respective weightings ("multipliers"), together with the actual incidence of non-compliant items. Elements covered include asset inspection, vegetation management, pole replacement and priority maintenance compliance with policy.

An explanation of how the BFM Index is calculated, providing information on the calculation formula and components is attached in **Appendix F**.

The objective is to reduce the index to zero by the start of the Fire Danger Period and to maintain zero throughout the period.

## 9.2 FIRE STARTS

Reporting on Ground Fires and Pole Fires is done as they occur and reported to ESV. This is carried out in accordance with:

- **Policy 18 - 80 - CP0007 – ESMS Reporting to Energy Safe Victoria (ESV) and Fire Start Reporting to AER; and**
- **JEQA4UJ443MT-185-28490– Incident Management Procedure**

## 9.3 ASSET FAILURES

As part of continuous improvement towards the mitigation of bushfires, Powercor records the causes of fire ignition which are attributed to failures of electricity assets. Analysis of asset failures and failure trends are carried out in order to develop improvements to maintenance policies, technical standards, work practices and enhanced preventative actions which all contribute to risk management strategies. Investigation of failed assets is the responsibility of the Asset Investigation section.

The Strategic Asset Management Maintenance Sub-committee provides management and governance of the asset failure investigation process. The committee consists of representatives from Asset Policy and Performance, Bushfire Mitigation, Plant and Stations Maintenance, Compliance, Safety, Technical Standards as well as Senior Management including the General Manager Electricity Networks. The committee meets quarterly to:

- Ensure actions resulting from asset failure investigations address the identified issues, are appropriately prioritised and completed in a timely manner.
- Monitor the overall performance of the network assets and ensure that appropriate causal analysis and investigation is undertaken when unfavorable trends become evident.

The following procedure covers the reporting, analysis and investigation of failed assets:

### **Procedure 18 – 06 – P0001 - Asset Failure Investigation and Reporting**

## 9.4 BFM MILESTONES

Powercor have produced a set of BFM program milestones which specify the completion dates required for key Electricity Networks BFM activities. These BFM activities are:

- Submission of the Vegetation Management Plan to ESV
- Conducting the annual BFM post season review
- Submission of the Bushfire Mitigation Plan to ESV
- Submit the annual compliance report to ESV
- Complete annual internal compliance audit of the Bushfire Mitigation Plan
- Completion of POEL mail out to Powercor customers
- Conducting the annual summer pre-season briefing to Senior Management
- Completion of Line Condition Observation program

The achievement of these milestones is closely monitored and a copy of the BFM Program Milestones is attached in **Appendix B**.

## 10 Reporting and Monitoring

The Bushfire Mitigation Strategic Asset Management Sub-committee provides management and governance of the bushfire mitigation processes and fire season readiness activities.

Reporting processes are established which ensures that all levels of the BFM management structure, including executive management levels and ESV, are informed of the status of the company's preparedness and fire performance.

The reporting process incorporates requirements for:

- Prior to the Declared Fire Danger period
- During the fire danger season
- On Total Fire Ban days

Reporting and monitoring arrangements for TFB days are contained in the TFB Day Action Plan (refer **Appendix A**).

### **BFM Status Report**

The main method of monitoring the BFM plan is the BFM Status report, which includes the BFM Index. This report measures the status of a range of BFM activities against policy or program targets. Reported activities include asset inspection (including POELs), priority maintenance and vegetation outside policy clearance programs.

It is provided to senior management, the various people involved in BFM activities and ESV. The report is also loaded onto Powercor's Intranet site for viewing by all Powercor personnel.

The BFM Status report is compiled and reported on a monthly basis, outside the Declared Fire Danger Period and then reverts to weekly reporting during the Declared Fire Danger Period. The frequency of this reporting enables close monitoring by both Powercor management and ESV.

The frequency of this reporting is sufficient to enable the detection and rectification of any situation that could jeopardise the achievement of a state of full preparedness by the start of the Declared Fire Danger Period.

Powercor's Senior Bushfire Mitigation Advisor prepares the BFM Status Report from automated reports generated from SAP and OMS.

### **BFM Index**

Powercor's strategy to reduce the BFM Index is to closely monitor the key programs associated with the BFM program. This includes maintenance items, vegetation control and asset inspection.

### **Asset Inspection**

The Asset Inspection program is monitored by the Asset Inspection Group.

An automated daily exception report is generated from SAP and distributed by e-mail to relevant employees who monitor the asset inspection program. The Asset Inspection Group investigates any overdue poles to ensure appropriate action has been taken (including POEL poles).

### **Maintenance**

An automated daily Priority 1 report is generated from OMS and distributed to relevant employees by e-mail. The Operational Faults Manager checks any outstanding items to ensure prompt action.

An automated daily Priority 2 exception report is generated from SAP and distributed by e-mail to alert relevant employees of defects that are overdue for rectification or close to becoming overdue. The Maintenance Program Group investigates any outstanding defects and follows up to action them in accordance with:

- **Work Instruction 18 – 10 – W0006 - Management of Maintenance Items Outside Policy**

## Vegetation Clearance

Powercor produce a weekly report which is distributed to key stakeholders. This report provides program status updates on all vegetation management programs. Status reporting on vegetation outside policy is included into the BFM Status report.

## ESV

Powercor's reporting schedule to ESV, on its BFM activities, is listed below.

- Annual Vegetation Management Plan (supplied by the 31<sup>st</sup> March in each year)
- Bushfire Mitigation Plan (supplied every 5 years, minimum)
- BFM Status Report (reported monthly or weekly during the Declared Fire Danger period)
- Bushfire Performance Index (reported monthly or weekly during the Declared Fire Danger period)
- Ground and pole fire starts (reported as they occur)
- Fire Start Statistics (reported to ESV as per the ESV reporting requirements)
- POELs for disconnection on TFB days (reported monthly or weekly during the Declared Fire Danger period)
- Safety Program Report (Quarterly)
- Electricity Safety (Bushfire Mitigation) Amended Regulations 2016 (monthly)
- Electricity Safety Act (Bushfire Mitigation Civil Penalties Scheme) compliance report (by 1<sup>st</sup> August each year)

Reporting on issues found through ESV audit processes is carried out on request.

## 10.1 AUDITING

Powercor has produced a policy document covering auditing and inspection programme requirements:

- **JEQA4UJ443MT-175-29 - Audit and Inspection Programme Requirements**

This policy provides information for the process of preparing audit and inspection programmes conducted by both CitiPower and Powercor organisations.

Considering the range of audit and inspection programmes conducted across the organisation, each programme is required to determine:

- the scope of review or focus area
- the classification of review activity as Audit or Inspection
- the training/competency/qualification requirements of the auditors/inspectors executing
- the programme
- the frequency of review activities
- the method of selecting or prioritising the items/aspects to review

Powercor also has a program of system audits to validate the effectiveness of BFM processes, policies and systems used to manage or monitor BFM activities, these include:

- Internal audits of the BFM management programs and processes which are carried out by Audit Services. These audits are conducted to an internal audit schedule, which can be viewed on Powercor's Intranet site and are typically carried out between May and August each year.
- An annual ESV audit which is conducted in the lead up to the fire danger period and concentrates on adherence to the BFM plan and the processes and procedures that support the plan.

- An independent audit to assess compliance to the Electricity Safety Act sections 120M, 120N, 120O and 120P (Bushfire Mitigation Civil Penalties Scheme).

Audit improvement recommendations are documented and followed up for completion.

Other audits undertaken include:

### **Asset Inspection Audits**

Powercor's asset inspection contractor has a self-audit program that they manage and maintain. The audit program requires a follow up audit of all inspectors where sub-standard work is identified. An intensified audit program is then established for that inspector until the attainment of satisfactory results.

Powercor's asset inspection contractor includes the results of their completed audits (including POEL inspections) and corrective actions proposed/undertaken in their monthly asset inspection report.

Powercor also has its own independent audit program for monitoring the performance of asset inspectors. Powercor's Maintenance Services Officers are responsible for performing this function. These audits are conducted in accordance with:

- **05-C001.A-090 – Asset Inspection Compliance Audit Procedure**

Monitoring and auditing of the effectiveness of inspections and the competence of persons assigned to carry out inspections under the plan shall be done by monitoring and auditing the adherence to works practices which demonstrate skills and knowledge in Asset Inspection.

### **Maintenance Audits**

Maintenance project field audits are undertaken by the Network Services Field Audit and Quality Group, who have an audit program that includes random audits of completed projects, to ensure that the relevant technical standards and design specifications have been achieved in the finished project. Any additional audits are completed upon request.

This program results in a number of maintenance projects being audited each year.

Network Services have a structured audit program that audits key maintenance works and involves Program Managers, Construction Project Leaders and Maintenance Officers.

### **Vegetation Audits**

Powercor's Vegetation Quality & Engagement Team audits the activities and effectiveness of our vegetation management contractor in accordance with a documented audit schedule.

The vegetation management contractor also has their own internal audit program which addresses two key issues:

- Accuracy of vegetation identification and classification
- Vegetation trimming/removal to the requirements of the code

### **Line Condition Observations**

To observe compliance with the policies outlined in this plan and to help maintain employee awareness, line condition observations are conducted across the business leading up to and throughout the declared fire danger period.

Powercor's Senior Bushfire Mitigation Advisor organises the line condition observation program and selects suitable managers and employees to participate in the program. Observations are conducted in the Hazardous Bushfire Risk Areas.

The program is undertaken in accordance with:

- **Work Instruction 16 – 30 - W0004 - Line Condition Observation**

## 11 Reviewing

The Powercor Bushfire Mitigation Plan is reviewed each year and adjustments/improvements are made to better meet the objectives of the plan. There are various means by which feedback is obtained and improvements are identified including:

- Changes in Regulation
- The Post Fire Season Review, which is held at the end of the fire danger period to review performance under the plan. Attendees include Powercor senior managers, corporate risk personnel, internal auditors, and key personnel involved in the BFM program. Presentations are delivered on the businesses performance in each of the key BFM activities. Improvement opportunities are discussed and included into the BMP if required.
- The Summer Pre-Season Briefing, which is held before the start of the fire declaration period. It provides an opportunity to report on the progress of BMP activities and to plan contingencies, if the need arises, to meet the requirements of the plan.
- Internal and external audit findings.
- Technology changes

Reviewing/Updating of the Bushfire Mitigation Plan is undertaken in accordance with:

- **Procedure Bushfire Mitigation Plan Review & Update**

The value of the measures contained in the BFM Index is reviewed annually before the start of each fire danger period.

This review considers each of the components of the BFM Index to determine ongoing relevance of each the contributing elements which make up the index. This review is carried out in accordance with:

- **Work Instruction 16-30-W0001 Bushfire Mitigation Index Review**

## **12 APPENDICES**

**Appendix A**  
**TFB Day Action Plan**

**Appendix B**  
**BFM Program Milestones**

**Appendix C**  
**Vehicle Fire Equipment & Vehicle Movement**

**Appendix D**  
**Inspecting Power lines On Your Property Brochure**

**Appendix E**  
**POEL Inspection Notification Letters**

**Appendix F**  
**Powercor Consolidated Bushfire Mitigation Index of Fire Preparedness**

**Appendix G**  
**List of HVABC replacement sites**

**Appendix H**  
**List of SWER ACRs where protection settings & reclose functions cannot be remotely controlled**

**Appendix I**  
**List of SWER Fuses Downstream from the SWER Isolating Transformer, Excluding Distribution Substation Fuses**

**Appendix J – Referenced Documents**