



Attentis Technology

Submission to the Review of Victoria's
Electricity Network Safety Framework

Attention: Dr. Paul Grimes
Chair

Contents

Summary.....	4
Background.....	5
REFCL.....	6
REFCL Capabilities.....	7
Complimentary Technology.....	8

Summary

Attentis Technology supports the Victorian Government's objective for the electricity network safety framework of protecting the Victorian community by reducing the risk of bushfires and electrocution.

We welcome this independent review of Victoria's electricity network framework and the opportunity for comment that it presents.

Our submission examines the intent of the Victorian Bushfire Royal Commission (VBRC), the recommendations of the Powerline Bushfire Safety Taskforce (PBST) that were put in place to explore and test technology to achieve the intentions of the VBRC; the reports produced by Marxsen Consulting in testing the recommended technology of the PBST; ACIL Allen Consulting Regulatory Impact Statement (RIS) detailing the proposed amendments to the Bushfire Mitigation Regulations Amendments and the responses from the Distribution companies to the amendments.

In summary, we do not believe that REFCL or ACR can deliver the intended objectives without complimentary technology to confirm, or otherwise, a fire start. Furthermore, there is the real possibility that this approach could make situations more hazardous and endanger human life.

After reviewing the VBRC, PBST reports, the RIS and the response submissions, we have concluded that current measures (REFCL and ACR) may provide fire start reductions from powerlines (REFCL 33.6%-42% on polyphase and ACRs on SWER lines 35%-40%) however, significant operational and network changes and testing on live networks will have to occur to ensure these technologies protect the Victorian community by reducing the risk of bushfires and electrocution.

Installing components (REFCL/ACR) on existing networks still fails to address the issue of visibility. In the event of a line contact with the ground, it is **still unknown whether a fire start has occurred - the entire point of installing REFCL/ACR technology.**

Remote monitoring, combining detection (thermal, arc, smoke) visibility and live conditions needs to be incorporated to provide a level of intelligence to make informed response to REFCL/ACR technology being activated.

Without such sensor detection it will be unknown if:

- A fire start has occurred
- The location of the potential issue / fire
- What the proportionate response should be

This technology could also be used in daily monitoring of transmission/distribution infrastructure, increasing network knowledge and improving the efficiency of maintenance, inspections, safety and replacement.

Background

On the 16th February 2009, the Victorian Bushfires Royal Commission (VBRC) was established to “inquire into and report on the causes and circumstances of the fires that burned in January-February 2009, the preparation and planning before the fires, all aspects of the response to the fires, measures taken by utilities, and any other matter it considered appropriate”.

The VBRC was informed that the CFA and DSE attended or patrolled 316 grass, scrub and forest fires on that day. Of these, the Commission examined in detail 15 fires that caused (or had the potential to cause) the greatest damage. The VBRC concluded that five (out of 15) of the major fires that it investigated were started by powerlines. In its July 2010 Final Report, The VBRC concluded that: “The SWER and 22kV distribution networks constitute a high risk for bushfire ignition, along with other risks posed by ageing parts of the networks and the particular limitations of the SWER lines”.

The VBRC made 67 Recommendations, 8 related to reducing the likelihood of powerlines starting catastrophic bushfires.

The Powerline Bushfire Safety Taskforce (PBST) was established to recommend to the Victorian Government how to maximise the value to Victorians from the following two electricity-related recommendations.

Recommendation 27 : progressive replacement of 22kV and SWER powerlines

“the progressive replacement of all SWER (single-wire earth return) with bundled cable, underground cabling or other technology that delivers greatly reduced bushfire risk. The replacement program should be completed in the areas of highest risk within 10 years”. “The progressive replacement of all 22 kilovolt distribution feeders with aerial bundled cable, underground cabling **or other technology that delivers greatly reduced bushfire risk.**”

Recommendation 32 : disabling or adjustment of powerline reclose functions

“The State (through Energy Safe Victoria) require distribution businesses to do the following: disable the reclose function on the automatic circuit reclosers on all SWER lines for the six weeks of the greatest risk in every fire season.

Adjust the reclose function on the automatic circuit reclosers on all 22-kilovolt feeders on all Total Fire Ban (TFB) days to permit only one reclose attempt before lockout”.

The PBST was required to examine the following:

- Targeted replacement of SWER and 22kV lines in the highest bushfire risk areas with other network and **alternative technologies that deliver reduced bushfire risk**
- **Enhance fault protection systems to minimise fire starts from fault currents**
- **Faster identification and location of faults to enable more rapid fire fighting response**
- Installation of backup power supplies to enable selective and occasional deenergisation of high risk powerlines on catastrophic fire days without compromising power supplies to affected users
- The potential for isolated households in selected areas to move to stand alone power supplies disconnected from the grid.

The PBST was requested to:

- **Investigate technology and operating practices to reduce catastrophic bushfire risk with acceptable effects on cost, supply reliability, landowners and the environment**
- **Employ analysis, trials, expert advice and community and stakeholder consultation**
- Recommend a plan to reduce bushfire risk within ten year time frames, recommended by the Royal Commission that **maximises value to the Victorian Public** and;
- Advise on options for fairly and efficiently recovering the costs of implementing the plan

After review of the PBST Final Reports, the test reports from Marxsen Consulting, the ACIL Allen Consulting RIS and the subsequent responses, we are concerned about the following:

- examine “alternative technologies that deliver reduced bushfire risk”
- “Faster identification and location of faults to enable more rapid fire fighting response”
- “Investigate technology and operating practices to reduce catastrophic bushfire risk with acceptable effects on cost, supply reliability, landowners and the environment”
- “Employ analysis, trials, expert advice and community and stakeholder consultation”

As far as the documentation we have reviewed, the focus of the examination of alternative technologies was on REFCL technology. We remain concerned that the implementation of REFCL technology may not deliver acceptable levels of reduced bushfire risk.

We refer to Powercor’s response to the Regulatory Impact Statement - Bushfire Mitigation Regulations Amendment dated 30th December 2015, regarding the ability of the REFCL to mitigate bushfire risk;

- “There is much conjecture on the likelihood of REFCLs reducing bushfire risk. It is important that the conversation on REFCLs is based on fact and promises of safety and reliability benefits to consumers can be delivered. A case in point was the Minister for Energy and Resources statement that REFCLs will “stop a fault before it can start a fire” yet the RIS notes the recent CSIRO report that REFCLs will reduce the likelihood of bushfires starting by polyphase lines supplied by a zone substation by between 48 and 60 percent.”
- “There are no short term reliability benefits from operating REFCLs. The operation of the REFCLs on TFB days meets the recommendations of the Powerline Bushfire Safety Taskforce. However, extended operation of REFCLs on days other than TFB days could potentially result in negative reliability and public safety outcomes”.
- “Failure to replace all of the surge arrestors would lead to an increase in the number of fire starts. In particular the failure of a surge arrestor that is unable to withstand the over-voltages arising from the operation of a REFCL would induce a cross country fault on the distribution system that would result in multiple feeder outages and potential fire starts”.

There are multiple issues related to the implementation of REFCLs that may cause potential fire starts, and power outages that may increase the risk to the public. It is also noted that with REFCLs installed individual faults are harder to locate due to existing fault indicators not functioning effectively, requiring crews to physically patrol entire lengths of 22kv feeders to identify the fault location. This may also lengthen the time to restore supply to the public, impacting supply reliability and faster identification and location of faults.

AusNet Services’ response to the Regulatory Impact Statement - Bushfire Mitigation Regulations Amendment from AusNet Services dated 30th December 2015 stated the following:

- “the RIS assessment of the expected reliability benefits from REFCLs is questionable when analysed in the context of AusNet’s Services; network”
- “AusNet Services’ approach reflects genuine concerns regarding the technical and operational risks in using REFCLs to mitigate bushfire risk”

- “The primary objective in operating REFCLs in continuous compensation mode is to deliver reliability improvements, not bushfire safety. In this mode of operation, conductors may remain energized at unsafe clearances if, for example, damage to an overhead line is caused by a fallen tree. As a consequence, the assumed reliability improvements may be incompatible with the principal goal of bushfire risk mitigation”
- “Furthermore, the required integration of DFA and REFCL technology on AusNet Services network introduces an additional technical challenge which, if not properly addressed, could have a negative impact on reliability performance. We also note that the REFCL program will also require significant interruptions to customer supply – also negatively impacting on reliability – in order to undertake network balancing to ensure REFCL technology operates as intended”

REFCL capabilities

We remain concerned about the ability of REFCL technology to properly address fire starts from powerlines due to its limited capabilities;

“The REFCL only operates on multi-wire powerlines, which comprise of 64% of Victoria’s rural powerlines by length. It does not operate on SWER powerlines, however SWER lines could be replaced by multi-wire if that is an effective option to reduce fire risk”. PBST

“The REFCL only operates for wire-to-earth faults and not wire to wire faults. Fire risk from wire to wire faults not mitigated by REFCLs will occur where:

Wire clash – this event has a high probability of emission of molten metal particles that ignite a bushfire
Objects such as animals and vegetation fall across two wires of a powerline”. PBST

The following information provided by the Acil Allen Consulting RIS illustrates the limitations of REFCL to address fire starts from powerlines;

- Powerline related fire starts on Black Saturday from the 15 major fires investigated was 5 or 33%.
- REFCLs only operate on multi-wire powerlines which is 64% of the rural powerlines by length.
- PBST estimates 70% of fire starts are wire to earth / 30% wire to wire or other
- PBST further estimates that the REFCL would reduce the likelihood of (multi-wire) polyphase powerlines by 90% (supplier quoted), however analysis by the CSIRO estimated the installation of REFCLs reduce the likelihood of fire starts on polyphase powerlines by 48%-60%

The installation of REFCLs will result in the following reduction of fire starts from powerlines.

33.6% - 42% on multi-wire powerlines

21.5% - 26.7% of all powerline fire starts,

7.4% - 9.2% of overall bushfire ignitions based on 33% of all major fires being powerline related.

The estimated cost for the implementation of REFCL technology is \$432 million (Acil Allen RIS 2015). We remain concerned in relation to the cost benefit to the community considering the effectiveness of the REFCL technology to reduce fire starts from powerlines.

Complimentary Technology

Attentis supports the Victorian Government's initiative to proactively reduce the risk of bushfires to the community of Victoria.

The implementation of Victorian Government initiatives is an undertaking that requires the support and involvement of many organisations and the community as a whole. The undertaking of a solution should be completely supported to ensure that public safety outcomes and perception relating to value for money be maintained. The current initiative may not achieve the desired reduction in powerline related bushfires and may also contribute to further risk due to the alteration of the current operation of powerline networks and a lack of on-ground visibility in the event of a fire start.

We recognise that the installation of REFCLs forms part of the Bushfire Mitigation Regulations amendments, however, it is clear that secondary measures will be required to mitigate against fire starts not addressed by the installation of REFCLs.

The introduction of complementary remote monitoring technology can mitigate against:

- the possible shortcomings of the installation of REFCLs
- address powerline fire starts from all possible ignition sources
- address bushfire starts from other sources, arson, lightning strike, accidental ignition
- provide Distribution companies with a technology that will enhance operations and therefore encourage adoption
- provide significant benefits to the community through real-time severe weather and bushfire warnings
- increase public safety through smart evacuation and fire movement notifications
- address planned burn containment and operational safety

SUMMARY

For the current regulated safety measures to be effective, complementary sensing technology is required in order to 1) prove a fire exists, 2) provide the location of the fire, 3) make informed rapid decisions regarding rapid and proportionate response.

Additional sensing technology would also have a range of ongoing operational and community benefits in addition to bushfire safety.



Attentis Technology

connecting people to the environment

Every Network is a step closer

Head Office, Product Development and Manufacturing

3 Kembla Street
Cheltenham, Victoria, Australia, 3192
+61 3 9585 2716 / +61 3 9583 2157
support@attentistechnology.com
www.attentistechnology.com

United States Office

Via Colinas
Westlake Village, California, USA, 91362
+ 1 805 418 7979
info@attentistechnology.com
www.attentistechnology.com