



22 June 2018

Ms Sarah McDowell
Director, Energy
Essential Services Commission
Level 37, 2 Lonsdale Street
Melbourne VIC 3000

Dear Ms McDowell

Review of voltage standards in the Distribution Code

CitiPower, Powercor and United Energy welcome the opportunity to comment on the Essential Services Commission (**ESCV**) draft decision relating to its review of the voltage standards contained within the Victorian Electricity Distribution Code (**Code**).

Powercor and United Energy continue to install Rapid Earth Fault Current Limiters (**REFCLs**) on our networks to provide safety benefits to the community and so that we can comply with the amendments to the Electricity Safety (Bushfire Mitigation) Regulations 2013 (**Regulations**), which were implemented in Victoria on 1 May 2016.

Currently at the connection point of high voltage (**HV**) customers, the Code does not permit the voltages that will be required for the testing, commissioning and operation of REFCLs. The purpose of the review of the Code is to support the introduction of REFCL technology into sections of the Victorian electricity grid.

The ESCV's draft decision proposes to:

- remove the phase-to-earth voltage variation limits from the Code when a REFCL operates
- place the onus and costs on HV customers to harden their assets to withstand the operation of a REFCL
- require distributors to compensate HV customers if the phase-to-phase voltage variation limits are exceeded during REFCL operation
- require distributors to provide information on intentions or plans to install future REFCLs in the Distribution Annual Planning Report (**DAPR**).

The ESCV intends for the amended Code to take effect from one week after its final decision in August 2018.

We will not object to the ESCV decision to shift the burden from distributors to HV customers to harden their assets to withstand the higher voltages from the operation of a REFCL, or isolate from the network. We are, however, concerned about the negative impact and unintended consequences that this decision will have on our HV customers and the community more generally.

We consider that amendments to the Code should be made to not only reflect the current situation, but be flexible enough to accommodate future changes to the installation of REFCLs (or other technical solutions) that provide safety benefits to our communities.

Our key comments are that:

- the definition of "REFCL" should be amended to allow all installed REFCLs to be covered and not rely upon actions of Energy Safe Victoria (**ESV**)
- the amended Code should clearly demarcate the onus of costs between distributors and HV customers and not result in "grey areas" or confusion

- we support the removal of the phase-to-earth voltage variation limits when a REFCL operates
- the provision of information to customers would be clearer if placed on our website rather than in the DAPR
- the ESCV should clarify what a “reasonable” time period is to advise customers of the installation of a REFCL.

Please find our detailed comments attached.

Should the ESCV have any queries regarding this submission, please contact Elizabeth Carlile on [REDACTED], or [REDACTED]

Yours sincerely,

[REDACTED]

Renate Vogt
General Manager Regulation
CitiPower, Powercor and United Energy

1 Background

Powercor and United Energy continue to install Rapid Earth Fault Current Limiters (**REFCLs**) on our networks. The purpose of installing REFCLs is to provide safety benefits to the community through reduced risk of our electrical assets contributing to starting a fire.

A REFCL is a network protection device, normally installed at a zone substation, that can reduce the risk of a fallen powerline or a powerline indirectly in contact with the earth causing a fire-start. It is capable of detecting when a powerline falls to the ground and almost instantaneously reduces the voltage to near-zero on the fallen line.

For Powercor, the installation of REFCLs also ensures compliance with the amendments to the Electricity Safety (Bushfire Mitigation) Regulations 2013 (**Regulations**) which were implemented in Victoria on 1 May 2016. The Regulations require each polyphase electric line originating from 45 specified zone substations to comply with performance standards specified in the Regulations, by 1 May 2023.

The Regulations are technology neutral and do not specify the use of REFCLs. However, the installation of a REFCL is the only technically feasible solution available that is capable of satisfying the performance requirements specified in the Regulations.

For United Energy, REFCLs have been used to undertake research and development (**R&D**) collaboratively with the Victorian Government and other distributors to investigate the capability and application of the technology to Australian distribution networks. Additional REFCLs are now being installed to provide safety benefits to the community.

2 Definition of REFCL

REFCL or REFCLs is defined in the draft decision as “Rapid Earth Fault Current Limiter or any other technology, which as minimum satisfies the *required capacity* as defined by the *Electricity Safety (Bushfire Mitigation) Regulations 2013*”.

The phase-to-earth voltage standard does not apply during a *REFCL condition*, which means operating conditions on the 22kV network caused by the “proper operation” of *REFCLs* (as defined above).

The effect of the definitions is that the change in voltage standard only applies to REFCLs that meet the *required capacity* as defined by the *Electricity Safety (Bushfire Mitigation) Regulations 2013*. It would not apply to REFCLs that are unable to meet *required capacity* nor would it apply to REFCL commissioning prior to the achievement of *required capacity*. Furthermore it would not apply to REFCLs that are installed for other purposes.

We consider that the definitions should be amended to remove the reference to required capacity, and to apply across the entire 22kV or medium voltage network of distributors.

2.1 Limitation of reference to required capacity

The use of the term required capacity creates uncertainty into the application of the Code and is not appropriate. It should be removed from the final version of the amended Code.

The requirement to satisfy *required capacity* in the definition of REFCL has the following effect:

- limits the application of the amended voltage standard to only apply after required capacity is achieved. It does not apply during the commissioning of the REFCL
- relies upon the approval by Energy Safe Victoria (**ESV**) that a REFCL has achieved required capacity
- potentially limits the definition to the 45 zone substations specified in the Regulations, as it is not clear that for other REFCLs that distributors are seeking to achieve the technical performance for required capacity, or that ESV has a role to play in approving required capacity for those REFCLs

- creates a “grey area” in terms of cost allocation if ESV does not agree that the REFCL has achieved required capacity, or if ESV grants an exemption to a distributor from fully achieving the required capacity at any zone substation.

The amended Code should not be reliant on the actions of another regulator.

2.2 Apply REFCL requirement across the entire 22kV network

The definition of REFCLs potentially has the effect of limiting the amended Code to the 45 zone substations specified in the Regulations. This delineation:

- does not allow for changes in the operation of the network
- has the potential to create uncertainty as to who is responsible for bearing the costs associated with HV customers
- does not future proof the Code from future changes in obligations.

We therefore consider that the revised version of clause 4.2.2 should apply across the entire 22kV network in Victoria. That is, any customer connected or connecting to the HV network is able to withstand the higher voltages caused by the operation of the REFCL, or is able to be isolated or disconnected from the network.

Firstly, networks are dynamic and the open points may change on either a temporary or permanent basis, such that a feeder that is usually served by one zone substation may be shifted to be served by another. Take for example a HV customer that is planning to connect to a feeder typically served from a non-REFCL zone substation, such as Ouyen. Should there be an outage at that zone substation, the feeder serving the HV customer may become supplied by an adjacent REFCL zone substation, such as Charlton — this may have safety implications if the HV customer’s assets are not able to withstand the higher voltages caused by the operation of the REFCL, or the customer is not isolated or disconnected from the network.

If Powercor is restricted in its ability to transfer supply due to a HV customer connection not being REFCL compatible, this will result in a loss of flexibility in the operation of the network and reduce the ability to maintain reliability for all customers connected to the network. Powercor may elect to simply disconnect the customer, which is not ideal for the HV customer. Alternatively, if the REFCL needs to be turned off in such situations, the bushfire safety benefits are then compromised.

Secondly, there are several circumstances that could arise where there is a lack of clarity for HV customers as to who bears the costs and when. Consider the following scenarios:

- a HV customer is served from a non-REFCL zone substation, such as Geelong East. Should there be an outage at that zone substation, the feeder serving the HV customer may become supplied by an adjacent REFCL zone substation, such as Waurin Ponds — it appears from the draft decision that the distributor rather than the HV customer is liable for costs associated with the HV customer
- a HV customer is served from a non-REFCL United Energy zone substation such as Glen Waverly, however should there be an outage at that zone substation, the feeder serving the HV customer is supplied by an adjacent AusNet Services REFCL zone substation such as Ferntree Gully. Should United Energy or AusNet Services ensure that the customer is appropriately hardened, or simply disconnect the customer from the network in these contingent situations?
- a HV customer is planning to connect to a zone substation that is not listed in the Regulations as being obligated to install a REFCL, such as Torquay, however Powercor is in the process of seeking a recommendation for an exemption from the Section 8 Committee to ESV and agreement from the Minister for Energy, Environment and Climate Change and the Governor in Council to install the REFCL at Torquay rather than the Waurin Ponds zone substation that is listed in the Regulations — should the HV customer

ensure their connection is appropriately hardened when they connect, or take the risk that the exemption is not granted?

- a very large HV customer is connected to two zone substations for redundancy purposes — one zone substation is a REFCL zone substation (such as Corio) and one zone substation is not a REFCL zone substation (such as Ford North Shore). Who is responsible for bearing the costs?

As noted above, United Energy has used REFCLs for R&D purposes and continue to install REFCLs to deliver safety benefits to customers. Under the draft decision, any HV customer currently connected to a United Energy zone substation is not responsible for hardening their assets to withstand the REFCL voltages, or isolating or disconnecting from the network during the operation of a REFCL.

Furthermore, any new or modified HV connection to the United Energy network, or Powercor zone substation not listed in the Regulations, the distributor will be responsible for hardening or isolating from the network. However the HV customers are best placed to manage this risk, as the connection applicant can procure REFCL compatible equipment such that their connection is constructed to withstand the over-voltages caused by the operation of the REFCL. We consider that there will be minimal, if any, cost impact on those HV customers.

That said, United Energy and Powercor will need to anticipate the connection of HV customers to the network, and forecast costs in their Regulatory Proposals to the Australian Energy Regulator (**AER**) to address these new HV customers. The impact of the ESCV draft decision may therefore be to place an inefficient cost burden on other United Energy or Powercor customers through higher tariffs.

2.3 Apply REFCL requirement across entire medium voltage network

As noted above, the definition of *REFCL* and *REFCL condition* means that the phase-to-earth voltage standard does not apply on the 22kV network in the event of the proper operation of a *REFCL*.

Arguments were made at the ESCV's forum on 13 June 2018 that the limitation to the 22kV network is inappropriate, and should be applied across all medium voltages. In particular, the *Electricity Safety Act 1998* references all voltages from 1kV to 22kV and therefore the Code should be the same.

It was also noted that applying the revised voltage standard across all medium voltages should future proof the Code in the event that additional REFCLs or an alternative technology is required to be installed in the network. For example, the Victorian Government may require new equipment to be installed for reliability or safety purposes.

We support these arguments.

2.4 “Proper” use of the REFCL

The definition of the *REFCL condition* refers to the “operating conditions on the 22kV distribution system caused by the proper operation of the REFCLs which results in the neutral reference of the three phase distribution system moving to allow the phase to earth voltage to approach a value close to the phase to phase voltage”.

We seek clarity from the ESCV as to what the improper operation of the REFCL could be.

3 Shifting of onus to HV customers

We do not object to the ESCV draft decision to immediately transfer the responsibility from distributors to HV customers for hardening of the HV customer asset to withstand the higher REFCL voltages or isolating the

connection from the network when a REFCL operates. We are, however, concerned about the impact that this decision will have on our HV customers, and the community more broadly.

The ESCV draft decision appears to be predicated on the comments by the 2009 Victorian Bushfires Royal Commission (**VBRC**) that electricity consumers bear the entire cost of implementing the recommendations.¹ It is arguable that this implies that HV customers must bear the entire cost for REFCLs, as electricity consumers could pay through the distribution component of their electricity bill (if the distributor initially incurs the cost) or through their taxes (if the Victorian Government initially incurs the cost). It is also noted that REFCLs were not explicitly considered at the time of the VBRC report, rather they were identified by the expert taskforce set up to undertake further analysis into two of the recommendations of the VBRC, namely the Powerline Bushfire Safety Taskforce (**PBST**) in 2011.²

The ESCV draft decision has the effect of ‘shifting the goal posts’ halfway through a REFCL deployment program. As the ESCV is aware, the AER has approved expenditure for Powercor to install isolating substations for our ‘tranche one’ HV customers. Should the ESCV draft decision be confirmed in its final decision, the AER will reject similar expenditure for our ‘tranche two’ customers. Consequently, some existing HV customers will have an isolation substation installed at the expense of the distributor, whereas other existing customers will be required to fund their own isolating substation or harden their own assets.

We are concerned the outcome of the ESCV decision is inequitable for our HV customers. Whether the customer or distributor pays will ultimately hinge on the location of the customer and the allocation by the distributor of the relevant zone substation into one of the three tranches for REFCL deployment to meet the requirements in the Regulations.

We are also concerned by the cost burden that the requirement will place on our HV customers. Indicatively, the cost of each isolating substation for Powercor is around \$750,000. It is noted that some customer sites require more than one isolating substation given the size of the connection. We are concerned about the financial hardship that these costs may impose on existing HV customers which may result in failure of the business and loss of employment in regional areas.

The ESCV states that the Victorian Government is developing a high voltage customer assistance program (**HCAP**) to provide assistance to affected HV customers.³ However, at the time of preparing this submission, details regarding the timing and eligibility requirements for the fund were yet to be released.

Finally, we are also unclear what will happen if a HV customer does not harden. The ESCV have advised that they may direct us not to operate a REFCL, which will lead to an inefficient outcome where the customers of Powercor and United Energy have paid to install REFCLs, but the customers do not receive the associated safety benefits given the lack of action by a HV customer. This will lead to an outcome that is arguably inconsistent with the ESCV’s legislative objective which is to promote the long term interests of Victorian consumers.

¹ ESCV, *Electricity Distribution Code – Review of voltage standards for bushfire mitigation*, Draft Decision, 22 May 2018, p. 12.

² Refer Powerline Bushfire Safety Taskforce, Final Report, 30 September 2011. The PBST identified REFCLs as a cost-effective solution that can operate on 22kV powerlines as a new protection technology that can detect and turn off power at a fault almost instantaneously, thereby reducing the likelihood of bushfires starting. This technology was in response to recommendation 27 of the VBRC. The Victorian Government supported the implementation of REFCLs in its response to the PBST report, refer Department of State Development, Business and Innovation, *Power Line Bushfire Safety: Victorian Government Response to The Victorian Bushfires Royal Commission Recommendations 27 and 32*, December 2011.

³ ESCV, *Electricity Distribution Code – Review of voltage standards for bushfire mitigation*, Draft Decision, 22 May 2018, p. 12.

4 Removal of phase-to-earth voltage variation limits

The ESCV proposes to remove the phase-to-earth voltage variation limits from the Code when a REFCL operates. We support this proposal.

The ESCV was not able to find an appropriate basis to prescribe new phase-to-earth limits for the effective operation of REFCLs. The ESCV engaged a technical consultant who noted that the regulations in other countries where REFCLs operate do not specify any phase-to-earth voltage variations. The ESCV was also unable to identify technical standards that are consistent with equipment specifications when a REFCL operates.

We support ESCV approach and consider that it appropriately future-proofs the Code for possible changes in the operation of the REFCLs. That is, the operating modes may change with acceptance of ESV. Such changes may be made in the future to deliver the reliability benefits from the operation of the REFCL that were outlined in the Victorian Government's Regulatory Impact Statement.⁴

5 Publication of information

The ESCV draft decision proposes to extend the existing obligations in the Distribution Annual Planning Report (**DAPR**). The proposed additional obligation is to provide public information regarding any intentions or plans to install future REFCLs within the distribution area.

The DAPR is a lengthy annual network planning document which sets out actual and forecast constraints on a distribution network over a five year period. It is aligned with the requirements of clauses 5.13.2(b) and (c) of the National Electricity Rules (**NER**) and contains the detailed information set out in Schedule 5.8 of the NER. The requirements are administered by the AER. The current requirements in clause 3.5 of the Code relating to the Distribution System Planning Report (**DSPR**) are mostly redundant as they are duplicative of the obligations in the NER.⁵

We consider that it would be simpler and clearer for the publication of the proposed information to be contained on our website. The benefits of this approach are:

- easier for a HV customer to find information on our website, rather than find the appropriate section in the DAPR
- can be kept up-to-date to reflect changes to the timing and location of the REFCL deployment program, rather than only being updated on 31 December each year
- easier for the ESCV to monitor.

The obligation to notify existing customers, or inform new or prospective customers, is contained within the DSPR section of the draft Code. We seek clarity from the ESCV that the DSPR (or website) is the appropriate medium for communication to the customer, rather than a direct communication between the distributor and the HV customer e.g. via email.

6 Other clauses

This section sets out our comments on other proposed clauses in the ESCV draft decision.

⁴ ACIL Allen Consulting, *Regulatory Impact Statement, Bushfire Mitigation Regulations Amendment*, 17 November 2015.

⁵ With the exception of clause 3.5.3A relating to CitiPower's CBD Security of Supply upgrade plan.

6.1 Inappropriate to minimise the frequency of the use of the REFCL

The draft amendments to the Code propose to impose an obligation on distributors to use best endeavours to minimise the frequency of which the distributor is operating a part or parts of the distribution network under the REFCL condition.⁶

This proposed clause is inappropriate. Either the clause should allow the use of REFCLs to compensate for faults and to carry out annual testing of the equipment, or it should be deleted.

Firstly, the clause should allow REFCLs to be operated in accordance with the operating modes set out by distributors in the Electricity Safety Management Scheme (**ESMS**) or Bushfire Mitigation Strategy Plan (**BMP**) accepted by ESV.

Second, to ensure that the REFCL is reliable it must be regularly operated and tested. It is necessary to undertake maintenance and testing of the REFCL with timing at the discretion of the distributor – typically testing would take place in winter. Furthermore, if the technology is only turned on a few days of the year there is a good chance it will not work when needed.

Finally, it may be considered that any REFCL not installed under the Regulations should not be operated at all to satisfy the ‘best endeavours’ requirement, which will remove all safety benefits associated with the installation of those REFCLs from the community.

6.2 Voltage variation monitoring

The proposed third dot point in clause 4.2.6 requires distributors to monitor phase-to-phase voltage variations outside of the limitations specified in Table 1A.

Phase-to-phase voltages are not impacted by the operation of the REFCL, and the Code already requires distributors to monitor and record the steady-state voltages and the voltage variations. This monitoring is carried out using power quality meters and advanced metering infrastructure (**AMI**) meters.

As such, we consider that this clause is unnecessary and can be deleted. Alternatively, the ESCV may wish to amend the first two dot points in clause 4.2.6 to specify monitoring and recording of voltages in both Tables 1 and 1A.

6.3 Reasonable time period

Draft clause 3.5.5 requires distributors to notify existing or prospective new customers of the installation and operation of a REFCL. For existing customers, we are required to use best endeavours to provide such notification in a timeframe which allows that customer a reasonable period to plan and implement any required works.

Take for example Powercor’s commissioning timetable for tranche two of its REFCL deployment program where some HV customers will need to be appropriately hardened or isolated by April 2019, whereas others may not need to be ready until 2020. This will result in some HV customers receiving nine months’ notice, whereas others may receive 24 months’ notice.

We seek the ESCV to provide guidance as to what it considers a reasonable time period to be.

⁶ Refer draft clause 4.2.4(b)