

29 May 2026

File Ref: 260322

Mark Harris
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Dear Mark

Thank you for your Official Information Act (the Act) request received on 1 April 2026. You requested:

- 1) What are the specific benefits/outcomes that can only be achieved by including PEN conductor switching?*
- 2) Why can EV charger protections (ie O-PEN and OPDD), generator connections and inverters with import/export capability all be safely achieved overseas without PEN conductor switching, but cannot be achieved here in New Zealand? This will specific require technical explanations.*
- 3) Specifically how does switching of the PEN conductor lead to safety improvements?*
- 4) Did New Zealand's departure from international minimum practice in allowing PEN conductor switching (something that is prohibited in Australia, the UK and countries using the international IEC standards) trigger any due diligence/sanity checking by WorkSafe?*
- 5) During drafting of its proposed update to the current guidance on connection of generators to installations to replace the current advice (<https://www.worksafe.govt.nz/about-us/news-and-media/connecting-a-generator-to-the-wiring-of-a-house-or-building-following-an-emergency/>) WorkSafe proposes PEN conductor switching. Is WorkSafe aware that their proposed is non-compliant? Was the draft proposal document peer reviewed?*

On 29 April 2026, we notified you of an extension to the time limit for deciding on your request by an additional 20 working days.

WorkSafe response

You refer to the November 2025 amendment to the Electricity (Safety) Regulations which remove the application of clauses 2.3.2.1.2(b) and (c) of AS/NZS 3000:2018 for New Zealand. This removes the explicit preclusion of switching the protective earth and PEN conductor from that standard.

As part of MBIE's regulatory amendment process, WorkSafe recommended to MBIE the removal of these clauses from application in New Zealand to better provide for electrical safety in some limited circumstances where there are acknowledged weaknesses with New Zealand's multiple earthed neutral ("MEN") system of electrical supply. This was made in reference to specific situations, being an:

- "EV" scenario in which a fault in supply to an installation or other installation fault enlivens the earthing system can foreseeably cause the metal bodywork of a connected EV to become enlivened during charging or discharging (including vehicle-to-installation (V2I) or vehicle-to-grid (V2G) systems); and
- "resilience" scenario where 'anti-islanding' provisions which are intended to protect the network and workers preclude an electrical installation which incorporates a solar (PV) or similar system from operating independently in the event of a significant network disruption.

The need to better provide for resilience of electrical installations received added emphasis following cyclone Gabrielle in 2023, after which WorkSafe issued guidance on how an electrical installation could be reconfigured for independent operation on a temporary basis.

Neither AS/NZS 3000:2018 nor the standard it replaces, AS/NZS 3000:2007, deal effectively or comprehensively with providing for electrical safety in these circumstances where there are known weaknesses with the New Zealand MEN system.

Removal of the restriction on switching those protective conductors allows for the future introduction of techniques which better provide for the safety of EV charging under foreseeable fault conditions. It is expected that the use of equipment such as open-PEN detection devices (OPDDs) will address some of the risks in the future.

OPDDs disconnect all live (active and neutral) conductors, and, at the same time, the protective (earthing) conductor to the charging point, which would otherwise continue to transfer the raised PEN conductor potential to conductive parts of the vehicle. This necessarily requires switching of the earthing conductor.

For 'resilience' solutions, to ensure safety for anyone working on or connected to the grid, operation of an installation in 'island mode' requires disconnection of all live conductors within the installation from the grid. This principle is expressed in WorkSafe's current guidance on temporarily configuring an installation for independent operation.

The amendments to the regulations provide a pathway for such products or techniques to be recognised. Once relevant and suitable standards and products are available, these products and techniques can be proposed for adoption.

Noting that these products, including relevant standards, were not well enough developed to be referenced by the regulations, WorkSafe proposed this change as an achievable preparatory step to better provide for safety in these scenarios.

WorkSafe considers the change does not immediately impact electrical safety in New Zealand. The recommendation was made after consideration of the issues being addressed, the relevant risks, and the need for further guidance or development of techniques to ensure safety in specific scenarios where 'switching' solutions offer benefits.

The regulatory amendment did not remove current controls which require an electrical installation to be safe. Specifically:

- any completed electrical design must be safe,
- any electrical installation must be safe (see regulations 13 and 14),
- high risk PEW must be completed by a licensed electrical worker and inspected by an independent electrical inspector, and
- it is expected that responsible licenced workers will ensure that risks are addressed as technology changes.

The change does not require that switching of these protective conductors be installed in any or all circumstances, and there is no requirement for an electrical worker to install switching in a protective conductor.

In other circumstances, switching should not be introduced into the protective conductors of MEN mains. It should be noted that the restriction on switching protective conductors has not historically been an absolute rule for New Zealand. For example, the Electrical Wiring Regulations 1961 allowed switching under tightly defined conditions. It was later, when the New Zealand and Australia adopted joint wiring rules (AS/NZS 3000), that this provision was lost.

In developing the recommendations, WorkSafe's Energy Safety technical experts carefully considered the relevant scenarios and both the likelihood and consequence of the proposed changes, given the characteristics of New Zealand's electricity supply system. This analysis considered and compared realistic failure modes and their likelihood and consequences. It took the history of events which led to significant consequences into account.

Given the recommendation was proposed as a preparatory step, with the intention that the restriction would be replaced by specific guidance relevant to each scenario, a formal documented risk analysis or cost-benefit analysis was not necessary. The anticipated guidance is intended to address scenarios in which 'switching' of either the main earth or PEN conductor would be permissible, and where it would not be permitted.

WorkSafe did not intend that 'switching' of these protective conductors would be permitted without introducing substitute controls to provide for safety. Initially, WorkSafe advised electrical practitioners not to install a switch, or other device that has a switching function, into a protective earth conductor or a PEN conductor unless they are following a document, issued or cited pursuant to the Electricity Act, which explicitly provides details on when particular switching is appropriate.

At present WorkSafe is continuing to develop:

- further guidance to set out principles of how an electrical installation could be configured for independent operation when connection to supply is lost, for example in a natural disaster;
- a replacement for its *EV charging guidelines*.

The development process for the guidance, whether it is published as secondary legislation or in another format, includes both internal review and stakeholder consultation.

This reply addresses the information you requested. If you require further assistance, please contact ministerial.services@worksafe.govt.nz.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Darren Handforth', with a stylized, cursive script.

Darren Handforth
Acting Head of Inspectorate