

August 2024

## Position paper

# Electrical work on, or in, proximity to energised electrical equipment

This paper details the position of the Resources Regulator regarding the high-risk activity of electrical work on, or in, proximity to energised electrical equipment.

The Regulator defines ‘work on, or in, proximity to energised electrical equipment’ as:

- work on, or in, proximity to equipment that is energised at a voltage that exceeds extra low as defined in AS/NZS3000.<sup>1</sup>
- any activity that exposes a worker to direct contact with energised exposed conductors, which normally operate above extra low voltage. The contact may be directly by a body part or contact made by hand-held tools or the introduction of any other conductive material. Close proximity means coming closer to the exposed energised conductors or live conductive parts than 500 mm.<sup>2</sup>
- any activity – including the disconnection/reconnection of live conductors or the introduction of any tools, equipment or element (solid, liquid or gas) – that may compromise clearances between live conductors, or between live conductors and earth that could, in the presence of sufficient fault current, lead to an arcing fault.
- testing of electrical equipment (other than testing whether or not the equipment is energised and when a worker is not required to be close to energised conductors or parts).<sup>3</sup>

## Target audience

This position paper is intended for mine operators and workers in control of electrical engineering activities in NSW mining operations.

## Legislation

Legislation states electrical work on energised equipment:

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<sup>1</sup> AS/NZS 3000:2018. *Electrical installations (known as the Australian/New Zealand Wiring Rules)*; Extra Low Voltage means voltage that does not exceed 50 volts alternating current (50V AC) or 120 volts ripple-free direct current (120V ripple-free DC) as found in *Work Health and Safety Regulation 2017* (NSW), s.5 Definitions.

<sup>2</sup> AS/NZS 4836:2023 *Safe working on or near low-voltage and extra-low voltage electrical installations and equipment*.

<sup>3</sup> *Work Health and Safety (Mines and Petroleum Sites) Regulation 2022* (NSW), Schedule 3, Part 1.2(1).

- is prohibited by the Work Health and Safety Regulation 2017 (the Regulation).<sup>4</sup>
- may be conducted under permitted circumstances (outlined below).<sup>5</sup>
- is a high-risk activity.<sup>6</sup>

## Permitted circumstances

According to legislation, electrical work on energised electrical equipment is permitted when:

- (a) it is necessary in the interests of health and safety that the electrical work is conducted on the equipment while the equipment is energised.
  - i. An example according to legislation is that “it may be necessary that life-saving equipment remain energised and operating while electrical work is carried out on the equipment.”
  - ii. It is the position of the Resources Regulator that, in the mining industry, it would be difficult to identify ‘life-saving equipment’ that would result in such a situation. It would only be under extreme emergency conditions that equipment could not sustain a short duration outage, planned or otherwise.
- (b) it is necessary that the electrical equipment to be worked on is energised for the work to be conducted properly.
  - i. The Resources Regulator finds it difficult to identify a circumstance which would give justification for conducting work on electrical equipment while energised.
- (c) it is necessary for the purposes of testing required under clause 155 of the Regulation.
  - i. Clause 155 relates to testing to determine whether equipment is energised before electrical work commences. This is not considered to be electrical work on energised equipment as discussed in this paper.
- (d) there is no reasonable alternative means for carrying out the work.<sup>7</sup>
  - i. It is the position of the Resources Regulator that convenience, business interruption, contract penalties, etc are not justification for carrying out work on electrical equipment while energised.

## Risk of live work

Additional hazards to workers carrying out work on or near energised electrical equipment only exist when energised, uninsulated conductors are exposed - intentionally or not - and are near the worker.

In addition to electric shock risk, the presence of significant fault current also adds the risk of arc flash. This needs to be considered when clearances between live conductors or live conductors and

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<sup>4</sup> Work Health and Safety Regulation 2017 (NSW), s.154.

<sup>5</sup> Work Health and Safety Regulation 2017 (NSW), s.157.

<sup>6</sup> Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 (NSW), Schedule 3, Part 1.2(1).

<sup>7</sup> Work Health and Safety Regulation 2017 (NSW), s.157.

earth may be compromised by either the worker or by the introduction of tools, instruments or other conductive elements (solid, liquid or gas).<sup>8</sup>

The introduction of test equipment that is insufficiently rated for the energised circuit being tested also increases the likelihood of an adverse outcome.<sup>9</sup>

Hazards associated with live work can be eliminated by the introduction of short duration isolations which allow for the insertion or removal of equipment, components and/or insulated barriers. Test equipment may also be inserted with display units positioned to maintain safe operating distances from exposed energised conductors.

## High risk activity notification

The Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 defines electrical work on energised equipment as a high-risk activity (HRA) and requires the operator to give notice to the Regulator. The waiting period before commencing the activity is seven days after being received by the Regulator.<sup>10</sup> A HRA must be completed for all individual applications.

To satisfy the requirements of legislation, an HRA notification of the intention to conduct live electrical work must include:

- the proposed commencement date for the activity
- the nature of the proposed high-risk activity, including particulars of how the activity must be carried out
- the location of the activity
- Information or documents required by Schedule 3 in relation to the activity
- risk assessment for specific tasks
- justification for the work based on the ‘permitted circumstances’ criteria (above)
- restrictions which will prevent the workers from contacting energised equipment
- assessment of the arc flash risk and control measures to limit to as low as reasonably practical.<sup>11</sup>

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<sup>8</sup> Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 (NSW), Schedule 2, Part 3.2.

<sup>9</sup> Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 (NSW), Schedule 2, Part 3.3(n).

<sup>10</sup> Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 (NSW), Schedule 3, Part 1.2(2).

<sup>11</sup> Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 (NSW), s.35(2).