



SAFETY ALERT

ELECTRIC SHOCK FROM 11 KV BUS TIE

INCIDENT

A contract electrician received a serious electric shock and burns when live 11 kV bushings in the rear of a bus tie circuit breaker cubicle was contacted.

CIRCUMSTANCES

Contractors had been engaged to carry out maintenance on an 11 kV distribution board at a coal operation. The board consisted of two incoming supplies, a number of feeder circuits and one bus tie breaker.

It was intended to have the entire board isolated for maintenance, but on the day it was found that power was needed elsewhere on the site, so it was decided to isolate only half of the board.

The electrician was progressively withdrawing circuit breakers on the isolated half of the board to perform maintenance actions on them, including wiping down bushings inside the circuit breaker enclosure.

Eventually the electrician arrived at the bus tie breaker, withdrew the breaker and carried out the same maintenance actions. When the electrician contacted one of the bushings a hand to hand electric shock occurred.



Photograph 1.
11kV distribution board.

INVESTIGATION

The change in circumstances which led to only isolating half the board meant that additional or alternative risk controls should have been identified. These risk controls should have been integrated into the work plan and implemented in a rigorous manner.

The bus tie breaker had been tagged, and taped off, but the tape was removed when the bus tie breaker was withdrawn, and the tags were attached to the breaker which was now located away from the bus tie cubicle.

Consequently, there were no tags, taps, locks or other warning to safeguard against persons accessing the bus tie cubicle.



Flaps over 11 kV bushings.

These flaps are normally lifted clear automatically by a mechanical action when the circuit breaker is pushed into the cubicle.

On this occasion, the electrician lifted the flap manually to access the bushings to wipe them down.

Photograph 2. View into the bus tie breaker cubicle

The bus tie breaker has been removed. A bus tie breaker is a means of connecting the bus bars in one half of a distribution board, to the bus bars in the other half. Because only half the board had been isolated, one side or the other of the bus tie was certain to be live. The incident occurred when the electrician lifted the flap on the upper set of bushings, encountering the live 11 kV parts.

Note: the investigation into the incident is continuing and all of the relevant factors have not yet been identified.

RECOMMENDATIONS

Before high voltage work is undertaken the following actions must be completed:

1. A properly conducted formal risk assessment must be carried out to examine any possibility of people coming into contact with energised conductors.
2. Detailed planning of the work must be carried out by a competent person.

3. A detailed documented work plan must be prepared with provisions for verification of each step.
4. Every step must be clearly and effectively communicated to all persons involved in the supervision and work.
5. Mines should ensure that they have an effective contractor management system to oversee planning and performance of contract tasks.

The entire process must be closely and continuously supervised by a competent person.

The process must include provisions for recognition of changed conditions and a requirement to stop work and formally review the risk assessment and work plan.

A person could be regarded as competent if they possess electrical competencies, have received formal training in High Voltage work, and have had thorough knowledge of the HV installation under consideration.

The steps outlined here must be expressed in a High Voltage Management Plan. The Management Plan should be based on hazard identification and risk assessment, and conform to the requirements of the "NSW Service and Installation Rules" and Appendix A. of AS 2467 'Maintenance of Switchgear'.

All mines and declared preparation plants that have high voltage installations should ensure that a High Voltage Management Plan is in place and active at the mine and is subject to review and audit.

The investigation into this incident is continuing and all of the relevant factors have not yet been identified. The Department may issue further communication on this issue.

Signed



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