



SAFETY ALERT

Electric shock direct contact with high-voltage electricity

INCIDENT

An electrician / plant operator received a serious electric shock and burns when direct contact was made with a live 3300 volt terminal in a switch-fuse unit that was fed from a 5-ampere earth fault limited system.

CIRCUMSTANCES

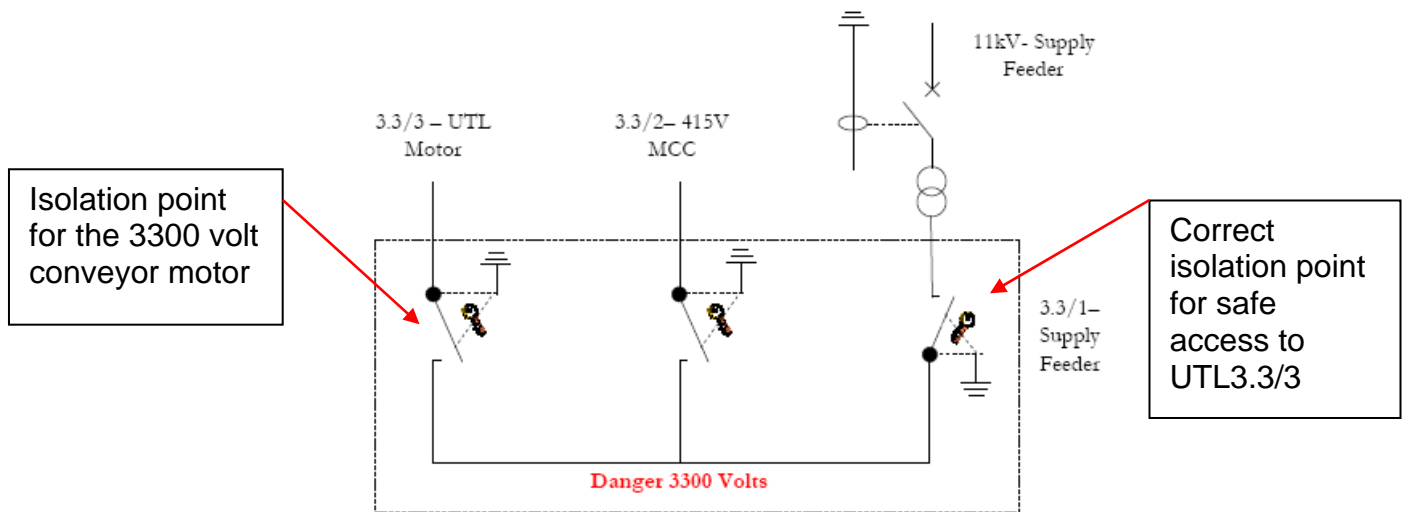
The electrician / plant operator had been given the task of isolating a surface conveyor belt to allow an electrical contractor internal access to the 3300 volt slip ring conveyor motor for fault diagnostics. The isolation was carried out at a 3300 volt MCC (UTL 3.3/3).

3300 volt switchboard



The motor starter panel was supplied from a high-voltage switch fuse (UTL3.3/3). This switch fuse had been previously been isolated by the electrician / plant operator. As part of the isolation, an interlocked earth had been applied to the load side of the switch fuse.

Single line circuit diagram



The motor repair contractor advised the electrician / plant operator that there could be a loose connection on the mains supply to the motor. The electrician / plant operator went to investigate for the loose connection on the 3300 volt wiring back at the MCC switch room. The electrician / plant operator required access to the conveyor motor switch fuse unit (UTL3.3/3) and relied on the isolation that he had previously carried out.

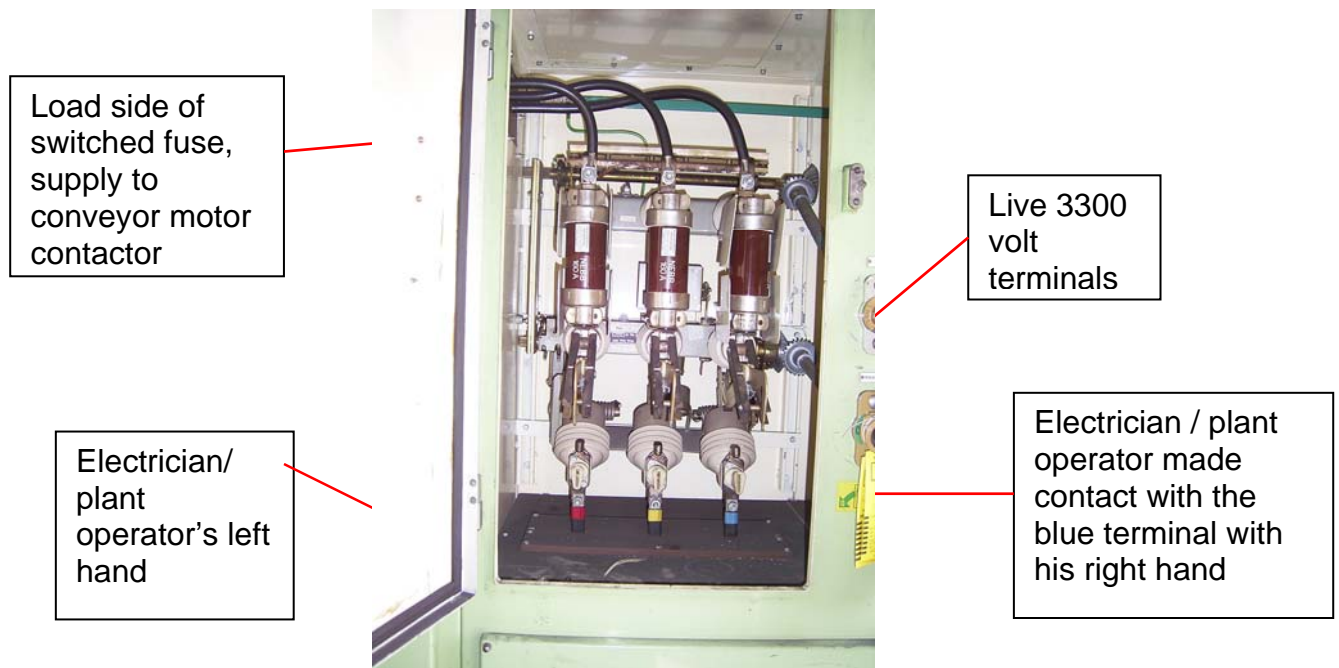
The electrician / plant operator removed a castel key from adjacent to the earth switch for the fuse switch (UTL 3.3/3); the interlock to the castel key had been released by the earth switch being applied. The castel key was used by the electrician / plant operator to gain access to the conveyor switch fuse enclosure (UTL 3.3/3).

The electrician / plant operator opened the switch fuse unit door and assumed that the bottom of the switch was isolated (dead). He did not "test for dead" before touching electrical conductors.

The electrician / plant operator had placed his left hand on the bottom of the panel frame and grabbed the blue phase with his right hand. He received a severe electric shock between both hands and consequently across the chest. He also received burns to both hands. Earth leakage protection located on the neutral of the supply transformer operated and disconnected the 3300 volt supply by tripping off the transformer primary (11,000 volts) circuit breaker via a shunt trip.

The electrician / plant operator was taken to hospital as per the coal operation's electric shock protocol and received treatment.

Panel UTL3.3/3 with the panel door open



INVESTIGATION

This incident is being investigated by the NSW DPI Investigation Unit.

RECOMMENDATIONS

1. Before high-voltage work is undertaken the following actions must be completed:
 - 1.1. Where mechanical interlocking is used to prevent access to live parts, the interlocking system must be correct for the application. These interlocks are to be verified and validated during routine maintenance.
 - 1.2. A properly conducted formal risk assessment must be carried out to examine any possibility of people coming into contact with an energised conductor.
 - 1.3. Detailed planning of high-voltage work must be carried out by qualified competent people.
 - 1.4. A detailed documented high-voltage work plan must be prepared with provisions for verification at each step.
 - 1.5. Every step must be clearly and effectively communicated to all persons involved in the supervision and work.
 - 1.6. All high-voltage work must only be carried out under a high-voltage permit system.
 - 1.7. All electricians that are involved in high-voltage switching and isolation must be trained and retrained periodically.

- 1.8. Mines are to enforce their 'Test for Dead' policy.
- 1.9. All underground mining operation that use high voltage should review their work practice to HB 242-2007 High voltage mining equipment for use underground (published by Standards Australia).
2. All mines are to audit and review their High Voltage Management Plan (HVMP)
 - 2.1. The basic requirement for the HVMP is the Service and Installation Rule of New South Wales 2006, issued by the NSW Department of Energy, Utilities and Sustainability.
 - 2.2. The audit and review should be conducted by a competent person or independent organisation.
 - 2.3. The audit and review should include the above parts of this Safety Alert.
 - 2.4. The audit and review should verify that the HVMP include the recommendations from the NSW DPI:
 - 2.4.1. Safety Alert SA05-11
 - 2.4.2. EES-001 (Technical Reference - Electrical Engineering Management Plan)
 - 2.4.3. ESS-002 (Technical Reference - Control and Supervision of Electrical Work)

The investigation into this incident is continuing. NSW DPI may issue further communication

NOTE: Please ensure all relevant people in your organisation receive a copy of this Safety Alert, and are informed of its content and recommendations. This Safety Alert should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's notice board.

Signed



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NSW DEPARTMENT OF PRIMARY INDUSTRIES**