

SAFETY ALERT

Electrical workers sustain fatal injuries following switch failure

INCIDENT

Two electrical workers were killed and two other people suffered serious injuries when a high-current fault occurred in an 11kV oil-insulated combined-fuse switch (CFS) fuse unit that they were maintaining.

The 3 February incident occurred in a non-mining installation in Western Australia, however this type of switchgear is widely used in NSW mines.

This incident remains under investigation by industry regulators for that jurisdiction.

CIRCUMSTANCES

It was reported that the workers were performing maintenance on the CFS unit and were in the process of replacing a fuse that had ruptured and consequently disintegrated.

This type of switchgear was initially designed more than 40 years ago and was supplied by a significant number of switchgear manufacturers.

The design incorporates fuses that are typically immersed in an oil-filled chamber. These fuses are installed between the live incoming terminals of the CFS unit, and a disconnect switch. The fuses provide circuit protection and the switch provides the ability to isolate the outgoing circuit connected to the CFS unit, which also incorporates an interlocked earth switch to allow the outgoing circuit to be earthed.

The design of the switchgear involved allows fuses to be replaced without isolating the incoming supply.

Long and Crawford GF3 CFS unit (left) and Ring Main unit (right) involved in the incident.



INVESTIGATION

The investigation to date has identified:

1. The incoming supply to the CFS unit was not isolated before the workers began work.
2. When the fuse ruptured and consequently disintegrated, material may have been distributed in the tank that aided the development of a short circuit fault.
3. Almost all the insulating oil contained in the fuse tank was vaporised or ejected from the tank during the fault.

RECOMMENDATIONS

Where a mine uses high voltage, oil-filled CFS units, regardless of the type or manufacturer, the mine operator should review and update their high voltage procedures to ensure:

1. Where a fuse has or may have operated that:
 - the switch or earthing mechanism is not operated unless the incoming supply to the CFS unit is isolated and earthed
 - the fuse tank lid of the CFS unit is not opened unless the incoming supply to the CFS unit is isolated and earthed
 - the incoming supply to the CFS unit remains isolated until all work is completed and the fuse tank lid closed.
2. Where other maintenance activities are to be carried out on this type of switchgear:
 - the fuse tank lid of the CFS unit is not opened until it is isolated from the incoming supply
 - the incoming supply to the CFS unit remains isolated until all work is completed.

FURTHER INFORMATION

www.commerce.wa.gov.au/publications/oil-insulated-high-voltage-hv-combined-fuse-switches

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



Rob Regan
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MINE SAFETY OPERATIONS BRANCH
NSW TRADE & INVESTMENT

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