



ORDER
ENERGY COORDINATION ACT 1994 S. 18B

TO: ALL PERSONS WORKING ON AND OWNERS AND OPERATORS OF OIL-INSULATED HIGH VOLTAGE COMBINED-FUSE SWITCHES

PRELIMINARY

Pursuant to s.18B of the *Energy Coordination Act 1994*, this Order dated 23 March 2015 is issued to and affects all owners and operators of electrical installations incorporating oil-insulated high voltage (HV) combined-fuse switches.

CATASTROPHIC SWITCH FAILURE ON 3 FEBRUARY 2015

On 3 February 2015, electrical workers were engaged to perform maintenance on an 11kV oil-insulated combined-fuse switch. A violent explosion occurred caused by a high-current fault within the switch tank. Most of the insulating oil in the tank was vaporised instantly.

The type of switch involved is designed to permit a work practice whereby the three fuse cartridges immersed in the tank can be changed while the in-coming high-voltage bus bars at the base of the tank remain energised.

This accident is under investigation by *EnergySafety* and *WorkSafe WA*. While the investigation is not complete, it appears that there has been a short-circuit fault in the switch tank following the rupture and disintegration of a HV fuse within the unit.

OPINION

Based on evidence obtained thus far from the investigation, I have formed the opinion that it is dangerous to carry out the above-mentioned work practice on HV oil-insulated combined-fuse switches, unless they are first completely isolated from the electricity supply.

Moreover, if one or more fuses have operated, they may have disintegrated, releasing conductive components into the switch tank. The act of operating the switch or earthing mechanisms may increase the probability of such components causing a short circuit with the live bus bars lower in the tank.

Therefore, safeguards are justified to protect those called upon to carry out electrical work repairs or other maintenance on such switches. My reasons for reaching this opinion are:

- A HV combined-fuse switch exploded at the Galleria Morley Shopping Centre on 3 February 2015, killing two persons and severely injuring two others.
- Any operation of a HV fuse means a major fault has occurred or a near-overload has persisted. It may be dangerous therefore to open the switch involved unless it is first isolated;
- It is potentially unsafe to perform work on any item of electrical equipment while parts of it remain energised, especially high-voltage equipment;

- Many oil-insulated HV switches, of unknown number and location, are owned and operated by private owners, with unknown histories of preventative maintenance;
- Many such switches, again an unknown number, are likely to have been up to 40 years in service;
- The switches may no longer be manufactured and spare parts could be difficult to obtain or not available.

This Order applies to all HV oil-insulated combined-fuse switches produced by any manufacturer, including but not limited to the following:

- Long & Crawford Ltd;
- GEC Alstom T & D Switchgear Ltd;
- Hawker Siddeley Switchgear Ltd;
- W Lucy & Co Ltd;
- Merlin Gerin Ltd;
- Reyrolle Switchgear Ltd;
- Whipp & Bourne Ltd;

ACTIONS REQUIRED

1. Where a fuse has or may have operated in a HV oil-insulated combined-fuse switch:
 - No person shall commence any electrical work on it, including operation of the switching or earthing mechanisms or opening the lid, until it is first completely isolated from the electricity supply.
 - Owners and operators of any such switch shall not permit any person to commence any electrical work on it, including operation of the switching or earthing mechanism or opening the lid, until it is completely isolated from all sources of electricity.
 - Switches worked upon must remain isolated until all work is completed and the tank lid closed.
2. Where no fuse has operated but routine maintenance is to be carried out on HV oil-insulated combined-fuse switches:
 - The switch mechanism may be switched off and earthed but no person shall open the tank lid until the switch unit is first completely isolated from the electricity supply.
 - Owners and operators of any such switch shall not permit any person to open the tank lid until the switch unit is completely isolated from all sources of electricity.
 - Switches worked upon must remain isolated until all work is completed and the tank lid closed.
3. Normal switching operations may proceed as and when required, provided there is no evidence of fuse operation.



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